

Chapter I:
Introduction
(Purpose and Need)

CHAPTER I: INTRODUCTION (Purpose and Need)

Scope of the Report

The intent of this combined *Cultural Landscape Report* (CLR) and *Environmental Assessment* (EA) is to guide treatment and use of the above-ground resources associated with the historic area at Jewel Cave National Monument. A thorough investigation and evaluation of the historic landscape has been conducted using National Park Service (NPS) and National Register of Historic Places guidelines. The documentation of historic significance and evaluation of integrity of the cultural landscape serves as a framework upon which treatment recommendations are based. The report provides park managers with a comprehensive understanding of the physical evolution of the historic landscape, and guidance for management of the site. The *Cultural Landscape Report* portions of the document have been prepared by Quinn Evans|Architects (QEA), and the *Environmental Assessment* has been prepared by Woolpert, LLC, to fulfill a contract with the Midwest Regional Office of the National Park Service. NPS staff have contributed specific sections of the *Environmental Assessment*.

Report Methodology (Applicable Regulatory Requirements)

This CLR was prepared according to National Park Service standards outlined in: *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*, and *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The CLR/EA was prepared in accordance with federal regulations (40 CFR 1500-1508) implementing the *National Environmental Policy Act of 1969* (NEPA), regulations of the *Council on*

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Environmental Quality (40 CFR 1508.9), *NPS Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*, and the *National Historic Preservation Act of 1966* (as amended). Other applicable regulatory requirements include: *Federal Cave Resources Protection Act of 1988*, *National Park Service Organic Act*, *American Indian Religious Freedom Act*, and the *Archeological Resources Protection Act*.

A field inventory of existing conditions and landscape features, and interviews with existing Monument staff regarding management and maintenance issues at the historic site, was conducted by Quinn Evans|Architects (QEA) in June 2003. Historical research was conducted by QEA at the following locations: the park administrative files, the accession files, the park library, maintenance flat files located in the visitor center, and the park archives located at Mount Rushmore National Monument.

The *Environmental Assessment* (EA) analyzes the impacts on the human environment from three alternatives, including the no action alternative and two treatment alternatives. The *Environmental Assessment* portion of the project is being coordinated by Woolpert, LLP, a consulting firm that specializes in environmental planning. QEA and staff from Jewel Cave National Monument also prepared portions of the *Environmental Assessment*.

Although the federal government has standard guidelines for the preparation of *Cultural Landscape Reports* and *Environmental Assessments*, there are no guidelines for preparing a combined report. The National Park Service has recognized that combining the two can increase the value of the overall document by integrating the information generated through the CLR with the in-depth evaluation process inherent

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to the *Environmental Assessment*. This improves and validates the recommended treatment while also combining the costs associated with preparation and printing.

This report has been organized in the following manner:

Part I: Site History, Existing Conditions, Analysis and Evaluation

- *Chapter I: Introduction (Purpose and Need)* – Documents the Purpose and Need for the proposed landscape treatment, scope of the report, location and description of the property, identifies project consultants, and describes the methodology used. Also, this chapter includes a description of topics that were considered and dismissed during the analysis and evaluation of potential impacts from the landscape treatment alternatives.
- *Chapter II: Site History* – Documents and analyzes historic information as it relates to the chronological development of the site. This section identifies the major periods of development and describes the evolution of the physical landscape.
- *Chapter III: Existing Conditions (Affected Environment)* – Describes and illustrates the existing conditions of the landscape features associated with the site. Additional topics that need to be addressed from a NEPA compliance standpoint are also described in this Chapter.
- *Chapter IV: Analysis of Cultural Landscape* – Identifies the extant features related to each of the property types associated with the National Register multiple property listing for Jewel Cave National Monument. Defines a proposed historic landscape district for Jewel Cave that supplements the multiple property listing. Evaluates the historical integrity of the character-defining features associated with the historic landscape district. Evaluates the landscape characteristics associated with the historic landscape including; natural systems and features, spatial organization, land use, circulation, topography, vegetation, views, buildings, structures, and small-scale elements.

Part II: Treatment

- *Chapter V: Management Philosophy and Management Issues* – Describes the four types of treatment for historic landscapes as outlined by *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* and *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*. Rehabilitation is selected as the most appropriate approach for the Jewel Cave Historic District. Management issues to be addressed by the treatment recommendations are identified and described.

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- *Chapter VI: Treatment Alternatives* – Three alternative landscape treatment plans are described at a schematic level of detail.
- *Chapter VII: Impacts from Treatment Alternatives (Environmental Consequences)* – The consequences of each treatment alternative are analyzed. The intensity, duration and timing of the impacts to each topic area is addressed as outlined in CEQ guidelines and as required in *NPS Director’s Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*. The impacts to each topic area are summarized in an impact summary matrix. The results of the impact analysis form the basis for identification of the Environmentally Preferred Alternative. The rationale for identification of the Environmentally Preferred Alternative is presented. Necessary mitigation measures are described.
- *Chapter VIII: Recommended Treatment (Preferred Alternative)* – *The recommended treatment adheres to a management philosophy of rehabilitation, emphasizing restoration within the historic core. This chapter includes schematic designs for treatment of the historic area.*
- *Chapter IX: Costs and Implementation* – *This chapter includes Class “C” cost estimates for implementing the recommended treatment, and an implementation plan.*
- *Chapter X: Consultation and Coordination* – Describes the process of public scoping/involvement, tribal coordination, and coordination with local, state and federal agencies.

Purpose and Need

The purpose of this combined *Cultural Landscape Report and Environmental Assessment* (CLR/EA) is to guide treatment and use of the above-ground resources associated with the historic area at Jewel Cave National Monument (also referred to as “the Monument” and “Jewel Cave”). The historic area serves as an interpretive site for the Monument. Selected elements within the historic area are listed in the National Register of Historic Places, as part of a Multiple Property designation that was accepted in April 1995. The analysis and evaluation conducted as part of this CLR/EA indicates that a historic landscape district, within which the previously identified contributing historic resources are located, is eligible for listing in the National

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Register as a district that contributes to the Multiple Property designation. A description of the proposed district and its boundaries along with the rationale for its eligibility, are provided in Chapter IV.

Since the initial development at the site in 1900, a series of incremental changes have affected the landscape. The most significant of these occurred during the period spanning from 1933 through 1939, when Federal Relief projects were implemented. During the 1940s, 1950s and 1960s, the historic area served as the only developed area within the park. Facilities for visitor services, maintenance, administration, and employee housing were all developed within the historic area boundaries. Since the new visitor center, maintenance facility, housing development and park administrative headquarters, were opened in the 1970s, most of the facilities associated with these uses have gradually been removed from the historic area. Some remnants of the 1940s through 1960s developments remain, and some additional elements have been introduced to the site. Also, the current and planned future use of the site will require that some changes be made.

The Monument staff is in need of a detailed plan identifying and recommending treatments for cultural landscape elements that are significant and contributing to the historic landscape, and elements that are non-contributing. The Monument also needs guidance on how to implement the future interpretation plan for the site, providing necessary visitor services while also minimizing impacts to the cultural landscape. Finally, the Monument needs guidance on how to best manage the significant cultural resources located within the historic area.

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The specific purposes of the actions described in this CLR/EA include the following:

- Determine the most appropriate management philosophy and treatment approach for the historic area.
- Preserve the significant historic resources within the historic area.
- Remove non-contributing elements that impact the cultural or natural resources within the historic area.
- Expand visitor experience of the Monument by expanding exposure to and understanding of the historic area and the history of the development of the park.
- Provide necessary visitor services including restrooms, a picnic area, gathering/interpretive area, and a weather shelter.
- Provide design options that explore the implementation of a shuttle-only access system for the historic area, or a combined independent vehicle and shuttle access system.
- Provide employee parking.
- Provide a private outdoor break area for employees.
- Provide a storage facility for the cave-tour lanterns.

Park Purpose/Significance and Description of the Site

Jewel Cave National Monument (1,273.51 acres) was created on February 7, 1908, by a proclamation made by President Theodore Roosevelt (Presidential Proclamation 799, 35 Stat. 2180) under the authority of the Antiquities Act (34 Stat. 225, June 8, 1906). The purpose of the Monument is to preserve the Jewel Cave ecosystem, especially significant caverns and other geological features, for its scientific

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interests and for public enjoyment. Additionally, the Monument is to preserve the cultural resources within its boundaries for public understanding and enjoyment.¹

Jewel Cave is a pristine and relatively unchanged underground environment. It includes many rare speleothems, including helictites, scintillates (root-like features eroded in chert and coated and coated with tiny quartz crystals, and delicate hydromagnesite balloons. The cave is a complex three-dimensional maze beneath about three square miles of surface area, making it one of the premier caves of the world. It is the third-longest cave in the world, with more than 130.3 miles of passages discovered, and more being documented continually. Airflow studies indicate that approximately two-percent of the cave has been discovered.²

Historic resources associated with Jewel Cave National Monument are listed in the National Register of Historic Places under a multiple property nomination that was accepted by the Keeper of the National Register in 1995. Three associated property types were identified as contributing to the multiple property listing including resources associated with tourism and the early development of Jewel Cave, 1890-1944; resources associated with the development and administration of Jewel Cave National Monument, 1908-1944; and resources associated with NPS rustic architecture and Public Works Construction, 1933-1942. Resources previously identified as contributing to the National Register Multiple Property listing include the

¹ *Final General Management Plan and Environmental Impact Statement*, Jewel Cave National Monument, South Dakota, June 1994, 1.

² *Ibid.*, 3-4; and personal communication, Mike Wiles, Cave Specialist, Jewel Cave National Park and Conn, H. W. 1966, *Barometric Wind in Wind and Jewel Caves*, *South Dakota: National Speleological Society Bulletin*, v.28, p.55-69. Based on a paper by Herb Conn and later personal communication between Mr. Conn and Mike Wiles, it has been shown that the cave exhibits a barometric wind that blows in or out in response to outside pressure changes. The volume of blowing air is proportional to both the pressure change and the total volume of the cave. By measuring the change in pressure and the corresponding airflow, it is possible to calculate an estimate of the total volume of the cave. The volume of the known cave is approximately 2.5 percent of the predicted total volume.

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Ranger Cabin, the trail leading from the Ranger Cabin to the historic cave entrance, and the historic cave entrance. Additional contributing resources have been identified through research conducted for this CLR/EA. They are described in Chapter IV.

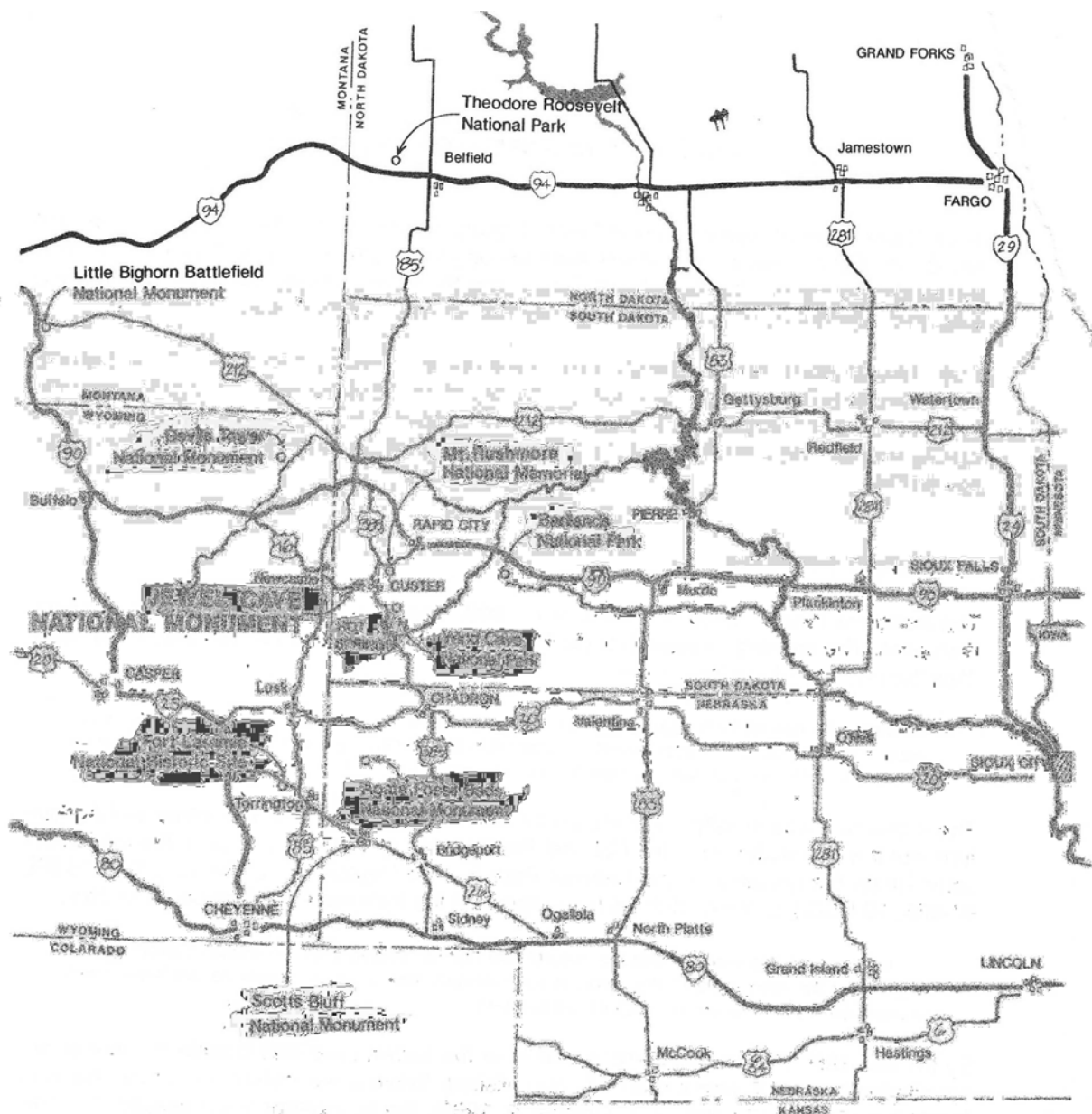


Figure 1.1: Regional Location (Source: *Jewel Cave National Monument General Management Plan and Environmental Impact Statement*, NPS drawing 146-20012-A-DSC-May 93)

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Location

Jewel Cave National Monument is located in the southwest corner of South Dakota in Custer County and the Black Hills Region. The region includes a large amount of public land including the Black Hills National Forest (of which Buffalo Gap National Grassland is a portion), Pine Ridge Indian Reservation, Badlands National Park, Mount Rushmore National Memorial, Wind Cave National Park, and Devils Tower National Monument in Wyoming. In addition, the state of South Dakota administers the 73,000-acre Custer State Park. The scenic beauty of the area and extensive public lands provide wide ranging opportunities for outdoor recreation making the Black Hills a destination area for tourists.³

The Monument encompasses 1,273.51 acres and is surrounded by the Black Hills National Forest. The explored cave underlies the Monument surface area and extends into the adjacent Forest Service lands.⁴ The historic area occupies approximately 10 acres in the northwest portion of the Monument.

³ *Final General Management Plan and Environmental Impact Statement*, Jewel Cave National Monument, South Dakota, June 1994, 38.

⁴ *Ibid.*

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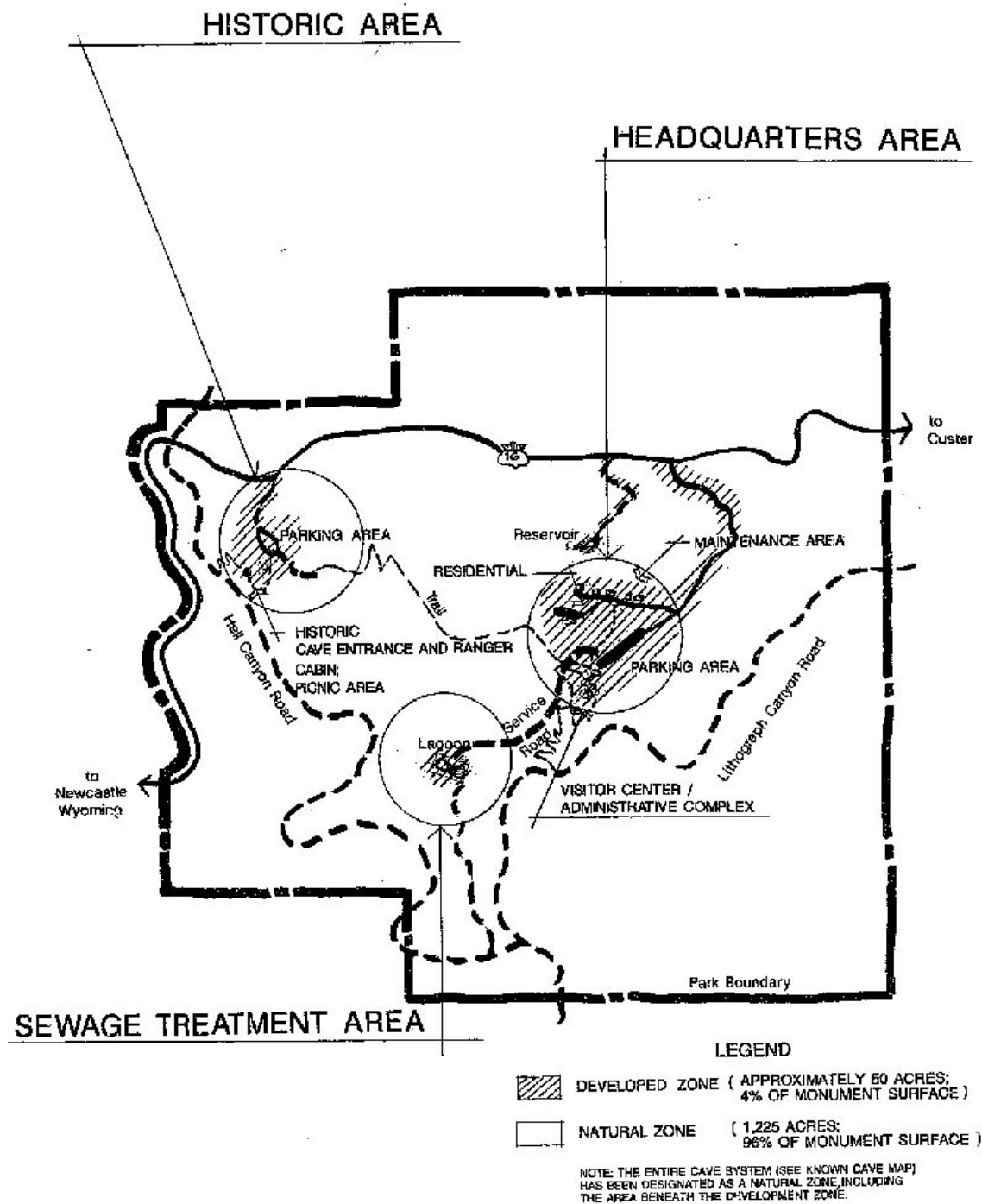


Figure 1.2: Current Park Boundary and Management Zones (Source: Jewel Cave GMP, NPS 000514.tif)

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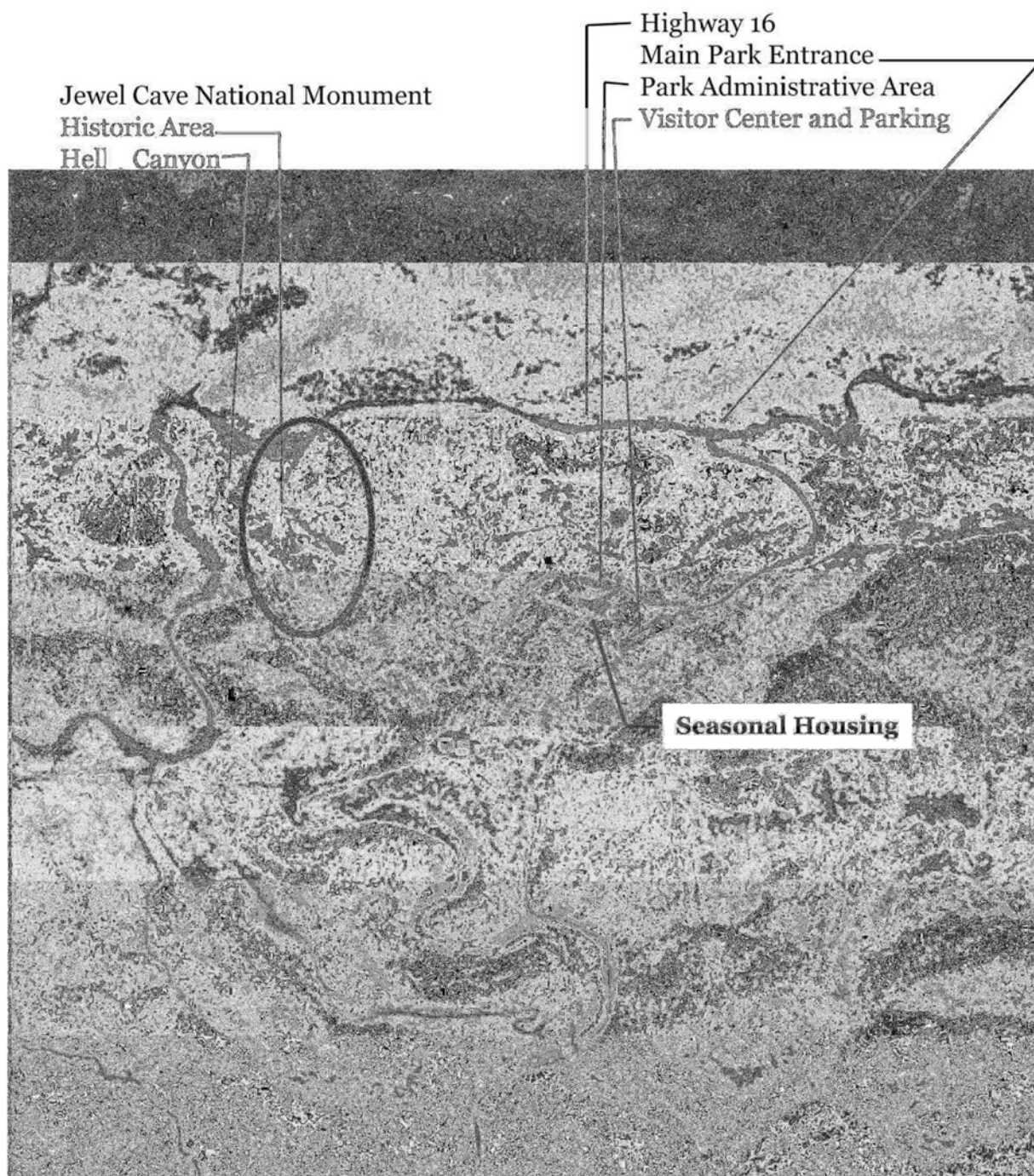


Figure 1.3: Aerial Photograph of Jewel Cave National Monument (Source: Jewel Cave National Monument, digital files)

Vehicular access is via U.S. 16. The Monument is 53 miles southwest of Rapid City, the largest city in the area (population of over 60,000 in 2000). The nearest city

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is Custer, 15 miles east of Jewel Cave, with a population of 1,741. Newcastle, Wyoming, with a population of 3,649, is 24 miles west of Jewel Cave National Monument.

Relation to Other Planning Projects

A General Management Plan for the Monument was prepared in 1993. The plan directs that historic resources within the monument be evaluated according to the Secretary of the Interior's standards. The Historic Structures Report prepared for the Ranger Cabin in 1999 and the current CLR/EA are meant to fulfill that directive. Therefore, the CLR/EA is tiered from the GMP. The Historic Structures Report provides a basis for understanding the evolution of the Ranger Cabin and establishes a period of significance and management objectives for that structure. Other planning documents including the Resource Management Plan (1999), the Long Range Interpretive Plan (Draft November 2001, the final will be completed in 2004), the Fire Management Plan (Draft 2004), and the Cave and Karst Resource Management Plan (Draft to be completed in 2005), serve to inform the CLR/EA with background and management information. These documents, along with research conducted as part of this CLR/EA, guide the formation of the treatment alternatives and the analysis of their potential impacts.

In 1993 the United States Congress passed the Government Planning and Results Act (GPRA) to provide for the establishment of strategic planning and performance measurement in the Federal Government. To comply with the Act, the Monument has established a goal to restore approximately 1/2 acre in the former housing area. This includes removal of foreign materials (mainly gravel) in the previously developed area, grading to restore the former topography (this involves

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removing materials from roads and housing sites and placing topsoil) and planting a native plant seed mix. The implementation of this project will depend on the recommendations of the CLR/EA. The recommended treatment plan provided herein supports the GPRA goal. The disturbance of the area occurred outside of the period of significance, and the remaining materials do not contribute to the integrity of the historic district. It is recommended that they be removed, and the topography and vegetation be returned as close as possible to their pre-disturbance conditions. More details about the recommended treatment are provided in Chapter VIII.

Issues and Concerns

The Jewel Cave Historic District contains the “original” or “historic” cave entrance that was discovered and enlarged around 1900. From 1933 until 1939 a number of federal relief projects were completed at the site, resulting in the development of an entrance road, log Ranger Cabin, pedestrian trail and stone stairs to the cave entrance, and other improvements. The character of the CCC-related developments established a rustic design quality that continues to exist today.

In 1972 when the “new” visitor center and administrative area of the park was opened, the historic area ceased to serve as the main visitor and operational center for the park. The former administrative, housing, and operations areas need to be regarded and revegetated. Revegetation is also necessary to repair damage to the historic area by the Jasper Fire of 2000.

The site is interpreted as a historic area whose relationship to the historic cave route is relayed by rangers during formal tours. Although visitors can access the site on their own during park operational hours, no passive interpretation is provided at the site. The current *Long Range Interpretive Plan* for the park recommends that the

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historic area ultimately be accessed only by those visitors purchasing tickets for the historic cave tour. These visitors could be transported to the site in a shuttle. This could result in a reduction of visitor parking in the historic district and enhancement of the visitor experience.

The site includes a historic core consisting of extant resources with high integrity however visitor services need to be improved to enhance visitor experience in the historic district. The existing portable toilets should be removed and replaced with permanent toilet facilities. The potential for impact to cave resources needs to be a primary consideration in identifying the type of new facilities.

Visitors are sometimes confused about site orientation and pedestrian access throughout the historic district. Site orientation cues and on-site interpretive signage is minimal.

The State of South Dakota is in early deliberations regarding a potential realignment and/or widening of U.S. Highway 16. This highway is the access road to Jewel Cave National Monument and the historic district. Relocation and/or widening of U.S. Highway 16 could affect the entrance to the historic area and alter the amount of surface water runoff from the road.

Treatment for the Ranger Cabin (HS-1) has been previously addressed. A 1999 *Historic Structure Report* (HSR) prepared by Alan W. O'Bright addresses changes to the cabin over time, and provides alternative approaches to preserve the building. The 1999 report supplements a 1995 *Historic Structure Report* authored by Nancy MacMillian. Restoration to its circa 1940 appearance was selected as the most appropriate treatment for the building. In 2002 the Ranger Cabin was restored and repaired according to recommendations presented in O'Bright's HSR.

Additional information on landscape management issues are summarized in Chapter V: Management Philosophy and Management Issues.

Impact Topics Selected for Analysis

Cultural Resources

The environmental analysis process focuses on all cultural landscape elements and any proposed future landscape treatments. This includes not only the exterior conditions and finishes of the structures but also how they interact with the surrounding matrix of plant communities. Activities such as digging to install plant materials, regrading soil or other ground disturbing activities have the potential to disturb archaeological resources. Landscape characteristics addressed include natural systems and features, spatial organization, land use, circulation, topography, vegetation, and views.

Cave Resources

A subset of geology is the cave resource. Data supports that the cave is impacted by water entering the cave through fractures in the limestone from surface developments. Changes in water quality or water flow patterns and changes in humidity could affect geologic formations, microbiotic, and macrobiotic resources.

Surface Water Quality

Changes in the amount of cleared area, type of vegetative cover, or relocation of Highway 16 could change the absorptive capacity of the soil — and runoff/infiltration patterns, intensity, and duration -- which could impact water quality of springs in the vicinity of the historic area.

Wildlife and Threatened and Endangered Species

Cultural landscape treatments may affect wildlife in the historic area during the construction phase of the proposed landscape treatments. Noise from light construction equipment and potential disturbance from construction activities may affect wildlife movement. Landscape treatments would reintroduce native plant species that could benefit wildlife by providing increased shelter and food.

Visitor Experience

Visitors come to the Jewel Cave National Monument to experience the underground resources of one of the longest caves in the world. Visitors are also attracted to the historic area and participate in interpretive tours that enter through the historic cave entrance. Actions taken by the NPS at the historic area, including landscape treatments, could either contribute to or detract from the overall visitor experience.

In particular, the proposed shuttle access to the site would change visitors experience. If the shuttle is implemented it will provide a more controlled presentation of the history of the site as a whole to visitors. If vehicular access to the site is limited to the shuttle, only visitors who pay to take the historic cave tour will have the opportunity to visit the historic site. Also, visitors riding the shuttle to the historic site might not have an opportunity to explore the cultural landscape at their own pace, or linger to have a picnic. Since all visitors arriving by vehicle would be accompanied by NPS staff, this approach would reduce the potential impacts to the historic resources associated with visitor use or vandalism.

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Socioeconomics

The use of a visitor shuttle from the Jewel Cave Visitor Center to the historic area may affect the local socioeconomic environment if a local vendor was given the opportunity to provide transportation services.

Solid Wastes

The two action alternatives would involve removal of asphalt from the road and parking area. Action alternatives would result in an increase in the waste stream to the regional landfill. The increase would only last as long as the duration of construction.

Utilities

Action alternatives taken at the Jewel Cave historic district would require improvements to the potable water supply to enhance visitor comfort.

Impact Topics Eliminated from Further Consideration

Floodplains and Wetlands

Floodplains and wetlands do not exist within the historic developed area at Jewel Cave National Monument. Natural Resource management treatment recommendations related to areas within the floodplain (Hell Canyon) would not require any changes to topography or the construction of new structures and would not impact the floodplain. Therefore, floodplains and wetlands were dismissed as impact topics.

Prime and Unique Farmland

There is no prime or unique farmland located on Jewel Cave National Monument. Therefore, prime and unique farmland was dismissed as an impact topic.

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Regional Air Quality

Jewel Cave National Monument has been designated as a class II clean air area. The South Dakota Department of Air Quality recommended using Badlands National Park as the guide for air quality at Jewel Cave. A representative from the South Dakota Department of Air Quality stated that monitors at Badlands National Park show that air quality is typically well below National Ambient Air Quality Standards (NAAQS) (personal communication with Brad Schulz, 2004). In most instances the pollutant levels are approximately 50 percent below NAAQS. It is unlikely that any of the possible landscape treatments would generate any noticeable air emissions. Implementation of possible landscape treatments might result in emissions from light construction equipment. Equipment emissions would be limited to short periods of operation and only during construction activity. Therefore, regional air quality was dismissed as an impact topic.

Environmental Justice

Under a policy established by the Secretary of the Interior, to comply with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, departmental agencies should identify and evaluate, during the scoping and/or planning processes, any anticipated effects, direct or indirect, from the proposed project or action on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks. Proposed treatment alternatives are not expected to cause any effects to minorities or low-income populations. Therefore environmental justice was dismissed as an impact topic.

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Indian Trust Lands

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no American Indian trust resources at Jewel Cave National Monument. The Monument is not held in trust by the Secretary of the Interior for the benefit of American Indians. Therefore, American Indian trust resources was dismissed as an impact topic.

Ethnographic Resources

The nature of any of the possible cultural landscape treatments within the historic district is such that there would be no direct or indirect impact on tribal members or their lands. Additionally, there are no known Native American traditional cultural places or sacred sites associated with the historic area. Therefore, ethnographic resources was dismissed as an impact topic.

Museum Collections

Actions concerning the cultural landscape would have no impact on the curation of museum items associated with Jewel Cave National Monument. Therefore museum collections was dismissed as an impact topic.

Soundscape Management

In accordance with National Park Service *Management Policies* (2001) and Director's Order #47, *Sound Preservation and Noise Management*, an important part of the National Park Service mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and duration of human-caused sound considered acceptable vary among National Park Service units depending upon the level of surrounding development.

Currently, the major source of man-made noise in the historic area is from vehicles accelerating or decelerating on Highway 16, across Hell Canyon. Any construction equipment used in landscape work would result in human-caused sound; however, the noise impacts from construction operations would be for short periods of time and only last during construction. Following proposed construction activities the historic area would revert back to its existing soundscape; therefore soundscape management was dismissed as an impact topic.

Lightscape Management

In accordance with National Park Service *Management Policies* (2001), the National Park Service strives to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human-caused light. Any construction activities associated with landscape work would take place primarily during daylight hours and would not require any permanent lighting at the historic

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area. The historic area would only be open to the public during daylight hours.

Therefore, lightscape management was dismissed as an impact topic.

Chapter II:
Site History

CHAPTER II: SITE HISTORY

This chapter presents a chronological history of the historic landscape at Jewel Cave National Monument, identifying each of the major periods of development and describing the evolution of the physical landscape. The discussion of each phase includes a narrative of the major events during the period.

Pre-Euro-American Settlement (Pre-1743)

The Black Hills served as a seasonal hunting area for Native Americans of the Middle Missouri River valley and the High and Northern plains cultures as early as 10,000 B.C. In addition to hunting, the abundant native stone was collected and manipulated for use as tools. Paleo-Indian camps have been documented at Hell Gap and Agate Basin that date between 10,000 and 5,000 B.C.

The McKean Complex people lived throughout the Plains during the Middle Archaic Period from 3,500 to 1,000 B.C. They hunted bison with projectile points and knives crafted from native stone. The Black Hills and Badlands continued to serve as seasonal hunting grounds during the Late Prehistoric Period (A.D. 200-1750) when ceramic production and the bow and arrow were introduced.

As Euro-American settlement pushed groups of indigenous people westward during the seventeenth and eighteenth century, the Kiowa, Crow, Ponca, Cheyenne, and Sioux continued to use the Black Hills seasonally. Since 1640, the Sioux Indians have been associated with the Black Hills through a series of treaties and the battle of

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Little Big Horn. The Sioux believe that the landscape of the Black Hills is sacred, including the caves and hot springs.¹

Early Exploration (1743 - 1860s)

Documentation of early European exploration in the Black Hills began in 1743 when a party led by Francois and Louis La Verendrye passed through the Black Hills. The French expedition moved throughout the region, seeking to explore and claim expansive western territories. When the Treaty of Paris was signed in 1763, Spain was temporarily given ownership to lands west of the Mississippi. France obtained title once again then transferred the land to the United States in 1803 as part of the Louisiana Purchase. The next year Lewis and Clark passed through the Black Hills, recording the area on their maps. Later explorers who skirted the northern portion of the Black Hills included the Astorian party in 1811 and the Hayden Expedition in 1854. When Hayden returned to gather physical and geological data on the Black Hills in 1857, he discovered and named Harney Peak.²

The Laramie Treaty of 1868 placed the Black Hills in the ownership of the Sioux, forbidding Euro-American use. However, the mineral resources of the region attracted attention and prospectors entered the area illegally. A United States military expedition discovered gold in the hills in 1874. The gold rush that immediately ensued resulted in mining claims, camps, placer mines, and crude roads that were established by prospectors on the Sioux land. The town of Custer was platted in 1875, making it

¹ Karsmizki, Kenneth W. *National Register of Historic Places Multiple Property Documentation Form for the Historic Resources at Jewel Cave National Monument*. United States Department of the Interior, National Park Service, 1993, 1-2.

² Ibid., 2.

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the first town established in the Black Hills. It served as an important hub for early gold mining activities.³

By 1876 Custer City had a population of 11,000 and in 1877 the Sioux were forced to cede the Black Hills to the United States government. The discovery of rich lodes of gold in Deadwood Gulch in 1876 directed population and development activities to the Deadwood area.

Transportation routes in the region were developed to take advantage of the gold mining activities. During the 1870s and 1880s routes were established that connected the area with Cheyenne, Wyoming; Sydney, Nebraska; Yankton, Pierre and Chamberlain, South Dakota; and Bismarck and Dickinson, North Dakota. Rail service reached Pierre and Chamberlain in 1880.⁴

By 1886 the gold rush had faded. Ranching and farming were gaining prominence, and settlement was solidified by the arrival of the railroad in Rapid City from Chadron, Nebraska. Ranchers took advantage of the 1862 Homestead Act, the Timber Culture Act of 1873 and the Dessert Land Act of 1877, as well as available public domain grazing land to expand their holdings and sustain their livestock in the arid environment. Cattle and sheep were brought to the public domain land to graze throughout the 1870s and 1880s. The Jewel Cave vicinity remained largely unsettled, although maps from the late 19th century indicated ranches and homesteads of varying size and duration in the area.⁵ The notes of a United States Deputy Surveyor who visited the area on 31 August 1896 indicate that the land was mountainous, with

³ *Soil Survey of Custer and Pennington Counties*, Black Hills Parts, South Dakota, 3-4.

⁴ Kenneth W. Karsmizki, 1993, 3. The Andreas Map (1884) reportedly shows a trail between Custer and Newcastle, Wyoming “Road to Jenny’s Stockade” – its route lay just south of the present boundary of Jewel Cave National Monument. This would be the road that went down Lithograph Canyon.

⁵ Ibid.

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settlers located along the canyons. Although characterized by a scarcity of water, springs along the canyons allotted a limited supply. The description of the timber is impressive, being described as “...beautiful, an abundant growth of heavy pine timber ranging from 12” to 30” in diameter is to be found within the boundaries of this Township,” and apparently the main reason for the recommendation that the Township should be subdivided.⁶

The Black Hills Forest Reserve and National Forest

The Forest Reserve Act of 1891 authorized Congress to withdraw timberlands from the public domain and to establish forest reserves by Presidential proclamation. The forest reserves were withheld from development but not actively managed by the government. Instead, they were simply treated as areas closed to use or extraction, and not made available to the public for any use. The earliest forest reserves were located in areas that were sparsely populated; their establishment went unchallenged.

On 2 February 1897 the Black Hills Forest Reserve was established by a proclamation by President Grover B. Cleveland, setting aside 960,680 acres of virgin timber lands in the Black Hills. The land was to be withheld from development and governed by the Department of the Interior, General Land Office.⁷ The establishment of the Black Hills Forest Reserve in an area with a population dependent on the use of forest resources as a basis for the local economy resulted in controversy. Protests regarding the “disastrous effects” of the Reserve on the local economy led to an

⁶ United States Deputy Surveyor, *Survey Notes*, Description of Boundaries of Township 4S, Range East of the Black Hills Meridian, 31 August 1896.

⁷ Rom, Lance, Tim Church, and Michele Church, eds. *Black Hills Cultural Resources Overview, Volume 1, Synthetic Summary*. (Custer, South Dakota: USDA, Black Hills National Forest, 1996. Chapter 5, the Development of the Black Hills, includes a section on The Black Hills National Forest by Brad Noisat and Linea Sundstrom.

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unsuccessful petition to President McKinley to abolish the Black Hills Reserve in March 1897. The controversy quickly led to the passage of the Pettigrew Amendment on 4 July 1897, which opened the forest reserves to development under the multiple-use concept. The Amendment provided that: “1) No new lands could be added to forest reserves except those needed to improve forests, to secure water flow, and to furnish continuous timber supply; 2) lands used primarily for mining and agriculture could not be added; 3) filing on forest reserve lands for mineral prospecting, mining, and related timber-cutting was permitted under the authority and administration of the Secretary of the Interior.”⁸ In effect, the Pettigrew Amendment ended the “protectionist” philosophy in Federal land management.

Timber consumption and mining were expanding in the Black Hills. Large companies required tremendous quantities of timber and were known to trespass on federal lands. The first large timber sale in a forest reserve, Case Number One, occurred in 1899. The transaction involved a 1,000 acre tract located in the Black Hills Forest Reserve. “This set a national precedence for sale of federal timber under conditions of regulated cutting ...and marked the beginning of scientific forest management on federal lands in the U.S.”⁹ In 1905 the administration of all forest reserves was transferred to the Department of Agriculture, the Bureau of Forestry became the U.S. Forest Service, and the Black Hills Forest Reserve became the Black Hills National Forest. In 1910 President Taft created the Harney National Forest from lands in the Black Hills National Forest (Proc. 1124, 6 May 1910). The Harney National Forest consisted of the southern half of the lands formerly included in the

⁸ Ibid., 5e-2.

⁹ Ibid., 5e-9.

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Black Hills National Forest and headquarters were established in Custer. The northern half of the forest, headquartered in Deadwood, retained the name Black Hills National Forest.¹⁰

The discovery of Wind Cave, and its promotion as a private tourist business beginning in the 1890s, set a precedent for the commercial and recreational development of natural resources in the region. By 1903, the need to protect the cave resources and provide access to the public was recognized. On 9 January 1903, 1,920 acres were removed from the Black Hills Forest Reserve to create Wind Cave National Park. Three years later the creation of Devils Tower National Monument on 24 September 1906 again required removal of land from the Forest Reserve. In February 1908, Jewel Cave National Monument was established and 1,273.51 acres were withdrawn from the Black Hills National Forest (as described above, this portion of the forest would be renamed the Harney National Forest two years later). The events leading up to the establishment of the Monument are described in the following narrative.

Discovery and Early Development of Jewel Cave (1900-1908)

The first known record of Jewel Cave was made by members of the Michaud family in 1900. Although there is some dispute regarding the actual date and participants in the discovery, a Placer and Water Rights Location Certificate (also referred to as “Location Certificate”) filed at the office of the Register of Deeds of Custer County on 31 October 1900 indicates that the cave was discovered on 18

¹⁰ Ibid., 5e-3.

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September 1900.¹¹ The Location Certificate was filed by four men, Frank Michaud, Albert Michaud, Felix Michaud and Charles Bush. The mineral claim was necessary, since the site was situated on public domain land in the National Forest Reserve. The claim is also referred to as the Jewel Lode and the Jewel Tunnel Lode in some documents.

According to one account Frank and Albert Michaud made the discovery earlier that year, possibly in June. Reportedly, Charles Bush heard of the discovery on 8 July 1900 and quickly prepared to join the Michauds in the Black Hills.¹² All versions agree that the Michaud brothers were prospecting in Hell Canyon and inadvertently discovered the cave entrance:

They were letting themselves carefully down a chimney in the rocks and remarking the favorable character of the place for a cave, when one of them noticed a hole a couple of inches in diameter and called his brother's attention to it, saying: "There is the entrance to a cave." The brother began pulling away the earth with his hand when a strong current of air blew a cloud of dust in his face. They knew so strong a current could come only from an immense cavern, and that they had indeed discovered a cave of great extent.¹³

After filing their claim, the group immediately set to work exploring the cave and building a road to provide an access route to the site for visitors. By 8 June the

¹¹ Office of the Register of Deeds, Custer County, South Dakota. *Placer and Water Rights Location Certificate*. 31 October 1900; Placer Record Book Y, 552. This document states that Jewel Cave was discovered on 18 September 1900 by Frank Michaud, Albert Michaud, Felix Michaud and Charles Bush.

¹² According to an interview he conducted with Marie Michaud Bogard, the youngest daughter of Francois Michaud (who was a brother of Felix Michaud and an uncle of Frank and Albert), a diary (Marie's?) told of a letter received on 8 July 1900 from Frank and Albert Michaud "telling in detail of a wonderful cave they had discovered in the Black Hills." "Marie remembered that Charles Bush (aka Charles Brusque) was there when the letter arrived and he was really excited and left for the Black Hills soon afterwards."

¹³ Sanford, Rev. John I. *The Black Hills Souvenir: A Pictorial and Historic Description of the Black Hills*. Denver: The Williamson-Haffner Engraving Company, 1902, 218.

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following spring, a road was complete.¹⁴ The emphasis on providing access to the public at such an early date may be indicative of the desire to raise funds to support the development and exploration of the cave. In continuing efforts to encourage the public to visit the cave, a two-story log house (also referred to as a log hotel) was constructed to provide lodging for visitors. In 1902, the accommodations were described in Reverend John I. Sanford's *Black Hills Souvenir* as "...commodious... providing hospitable shelter for the visitor, who will ever cherish the memory of a visit to the romantic place." Sanford was obviously impressed with Jewel Cave. He suggested that the "great attraction," when fully developed, would "rival the great wonders of nature."¹⁵ Another account agrees that by 1902, the "big log house was noble," a passable road had been constructed between the house and Lithograph Spring, and a "new entryway" to the cave had been excavated. The cave routes were explored and improved, and large timbers were installed and used as ladders.¹⁶ The log house (hotel) was constructed of rough hewn logs on a stone foundation. Developments at the site also included a spring house, barn, road, and an enclosure adjacent to the cave entrance.¹⁷ A conjectural period plan is illustrated in **Figure 2.1**. The two-story log hotel is illustrated in **Figures 2.2 and 2.3**.

¹⁴ *The Custer Chronicle*, 8 June 1901, 1; and Michaud, Ira, *What I have Heard and Seen*, Michaud indicates that a road was built from Lithograph Spring, northwest to the junction between the location of the present main Monument access road and U.S. Highway 16, and then west, down the drainage to the hotel site.

¹⁵ Rev. John I. Sanford, 1902, 218.

¹⁶ Michaud, Ira. *Statement regarding the history of Jewel Cave*. Unpublished typed document located in the library at Jewel Cave National Monument. August 15, 1989. Ira Michaud was one of Frank Michaud's three sons. He spent his childhood exploring Jewel Cave with his father and brothers.

¹⁷ Sheveland, Genna J. *A Level III (Intensive) Cultural Resource Survey of Jewel Cave National Monument*. Custer, South Dakota: United States Department of the Interior, National Park Service, 1998.

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A unique approach to draw visitors was developed in 1902 when the Jewel Cave Dancing Club was organized. In the Fall of 1902 the club included 31 members, all of whom were men. The dances were held in the two story house (hotel) at Jewel Spring.¹⁸

Although the partners applied for a patent for their claim in 1902, they were never issued the title to the land.¹⁹ A movement toward federal ownership of Jewel Cave began as early as the spring of 1903. In April of that year the United States government was reportedly considering making the cave a “national resort.”²⁰

By 1905 Charles Bush had moved to Orient, Iowa, and was no longer an active partner in the Jewel Cave project. The Michauds needed outside funding to buy out Bush’s interest in the claim, and to support the cave development endeavor. Frank and Albert Michaud sold one-third of the Jewel Tunnel Claim to Bertha Cain, of St. Louis, Missouri, on 10 November 1905 for six hundred dollars.²¹ On 27 November of the same year a Location Certificate Deed was filed by Frank Michaud, Albert Michaud, and Bertha Cain, describing the claim as relocated on 15 November 1905. The corrected description reflects the extended claim based on the cave explorations conducted. It is likely that this document was filed as a reaction to a claim filed by Henry Pilger on 2 October 1905. The document states:

¹⁸ 1902, Fall. Typed sheet listing 31 members of the Jewel Cave Dancing Club, organized 1902. A portion of the sheet indicates that dances were held in the two-story cabin at Jewel Spring. Eugene Akin, Horace Fowler, Vance Coe, and Albert Michaud are listed as officers of the club. It is believed that this two-story cabin is the same building as the two-story house/hotel referenced in other documents.

¹⁹ Ira Michaud, 1989.

²⁰ *The Custer Chronicle*, 4 April 1903, 1. The article indicates that the United States was considering making the cave a “national resort.” It advocates for the government to reimburse the owners if this happens, and lists Mr. Frank W. Michaud, Albert Michaud and Charles Bush as those whom presently claim the property.

²¹ 1905, November 10: *Indenture*, Recorded by the Clerk of the Circuit Court of Custer County, South Dakota. Legal Records (note from sheet in file at Jewel Cave National Monument) .

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...150 feet running Southerly from said center of discovery shaft; said Lode within the lines of said Claim, in no organized Mining District, County of Custer, State of South Dakota. Said Jewel Lode claim is located about 12 ½ miles from Custer and about 2 miles south of west from that town the south end of said claim being in Hells Canyon.²²

The next day an Indenture filed at the Custer County Circuit Court recorded the release of Charles Bush's rights to the Jewel Cave claim. Bush was paid three hundred dollars in exchange for his interest in the claim.²³

In 1905, Frank Michaud and Mamie Reilly were married. By 1910 the family included three sons, Francis, Ira, and Joe. Two daughters, Mary and Marie, were eventually added to the family. The family home was located on Lightning Creek, six miles east of Jewel Cave. Throughout their childhoods, the children helped in the cave explorations and improvements. Ira Michaud relays tales of the materials used, and the practice structure their father constructed at the homestead. The practice structure was designed to help the children develop caving skills by practicing at home.²⁴

The Michaud hotel site included several outbuildings and landscape features. In addition to the log house there was a "double-walled cache building" in the hillside, and other buildings. Also, in the front yard there was a vernacular rock sculpture that consisted of a "pyramid about seven feet high which contained many beautiful specimens very neatly arranged." The sculpture was named "Rocky," and included "so-called petrified moss from the warm waters of Fall River below Hot Springs," also there were "beautiful blue malachite from an old copper mine on lower French Creek,"

²² 1905, November 27: *Location Certificate Deed* (Book 15 of Location Certificate Records, Page 114, in the office of the Register of Deeds of Custer County, South Dakota).

²³ 1905, November 28: *Mining Deed Record*. Indenture recorded by the Clerk of the Circuit Court of Custer County, South Dakota.

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and “large pieces of quartz both in massive and crystal form.” Also there were “pieces of petrified wood from the Badlands” and “large books of mica still imbedded in the pegmatite material.” The pyramid was topped by the skeleton of the head and horns of a bighorn sheep. No photographs have been located of any of the structures at this site, with the exception of the log hotel.²⁵

It appears that the expenses for developing the cave exceeded profits made from tourist visits. The Michaud brothers sold an additional one-sixth interest in the Jewel Lode Claim to Bertha Cain on 3 January 1906 for \$300.²⁶ The Michauds continued to advertise the cave, indicating that a trail one and one-half miles long had been established through the cave by 1907. They offered tours for a nominal fee.²⁷

As the Michauds continued to struggle to make ends meet, a movement to preserve the natural resources in and around Jewel Cave was set into motion. As early as 1905, area residents voiced concerns about the management of the cave.²⁸ The idea to have a federal game preserve established became popular. The Forest Service undertook a study to consider the idea, resulting in a report indicating that the “natural resources of the area were of significant economic value for ranching, homesteading, and timber harvesting, and that it would not be in the interest of the

²⁴ Ira Michaud, 1989.

²⁵ Ibid.

²⁶ 1906, January 3: *Indenture* recorded by the Clerk of the Circuit Court of Custer County, South Dakota. Indenture signed by Frank w. Michaud and Albert Michaud of Custer South Dakota, transferring 1/6th interest in the of the Jewel Lode Claim to Bertha Cain of St. Louis, Missouri, for \$300. Legal Records (note from sheet in file at Jewel Cave National Monument)

²⁷ Kenneth W. Karsmizki, 1993, 4; and Ira Michaud, 1989. Karsmizki indicates that some specimens were removed from the cave and sold at Pilcher’s drugstore. Michaud disputes this claim and indicates that some crystals were stolen from the cave.

²⁸ Kenneth W. Karsmizki, 1993, 5.

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Forest Service or the locals to set a large tract of land aside as a game preserve.”

Instead, the report suggested that the area had sufficient scientific interest to warrant consideration as a National Monument.²⁹

Creation of Jewel Cave National Monument (1908-1928)

Congress passed the Antiquities Act in June 1906, providing for the creation of national Monuments by proclamation of the President of the United States. The Monuments were meant to differ from previous federal land reservations with their focus on areas of historical, prehistoric, or scientific importance. They were to be no larger than necessary to protect the specific cultural or scientific values of concern. Having no single administrative overseeing agency, the Monuments were placed under the administration of the departments of Interior, Agriculture, or War, depending on their location. The Antiquities Act gave very little direction regarding the day-to-day management of the Monuments other than indicating that taking antiquities from federal lands was illegal, and authorizing a permit system to allow excavation of antiquities from within the Monuments for professional research purposes. This focus on research at national Monuments differed from an emphasis on tourism and public use characteristic of national parks, and resulted in many Monuments remaining inaccessible for years. Eventually however, the policies of limited use and strict preservation of the Monuments gave way to extensive recreational tourism development when funding and staffing were favorable.³⁰

In February, 1908, a proclamation made by President Theodore Roosevelt created Jewel Cave National Monument. It was the first cave to become a National

²⁹ Ibid.

³⁰ Sellars, Richard West. *Preserving Nature in the National Parks: A History*. New Haven: Yale University Press, 1997, 13-14.

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Monument and contained 1,273.51 acres from the Black Hills National Forest. Jewel Cave became one of the twenty-eight national Monuments created in the first five years after the Antiquities Act was passed. **Figure 2.4** illustrates the original Monument boundary. The opening paragraph of Presidential Proclamation 799 (35 Stat. 2180) stated that:

Whereas, the natural formation, known as the Jewel Cave... is of scientific interest and it appears that the public would be promoted by preserving this formation as a National Monument, with as much land as may be necessary for the proper protection thereof...³¹

The Monument was placed under the management of the Forest Service, and in keeping with the times, was essentially ignored by the federal government for the next twenty-five years. **Figures 2.5** and **2.6** illustrate the location of the Monument within the boundaries of Harney National Forest. The map shows the locations of seven ranches (including Cramer's, Gillette's, Babcock's, Y4, Ninemile, Twelvemile, and LAK ranches), the State Forest and Game Preserve, Jewel Cave National Monument, roads and railroads. The road between Jewel Cave and Custer uses a route that passes by the Monument on the south. Mud Springs Road leads from the main east-west road north to the Monument. Hell Canyon is also illustrated, at the eastern side of the Monument.

The Michaud family continued to explore the cave independently until 1927 when a local business group, made up of members from both Custer and Newcastle,

³¹ Presidential Proclamation 799 (35 Stat. 2180); cited in Long Range Interpretation Plan, Jewel Cave National Monument, November 2001, 6.

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took over running the site until 1933. Ira Michaud (the second son of Frank and Mamie Michaud) recounts a story of strained relations between the family and the local business group. He suggests that they were treated as outsiders, and indicates that the “Custer group” wanted to gain control of the cave from the Michauds. Rumors were apparently spread indicating that the Michauds were conducting operations that would ruin the cave. Michaud indicates that “any mining of calcite crystal was purely a no-no, as their sole purpose was to preserve and protect the natural state of the cave.” He also states that a small amount of material was removed from the cave to be used for a religious shrine, the Grotto of the Redemption, in West Bend, Iowa. He accounts that a specimen was shipped in about 1915 and the removal was “strictly supervised by my father,” and “collected from remote side passages.”³² The shrine is extant and open to the public. No documentation regarding other sales of cave materials has been located.

In 1910 Albert Michaud left South Dakota, relinquishing his claim to the Jewel Lode to his brother Frank Michaud. Albert Michaud traveled to British Columbia, Canada, where he settled and eventually became a citizen of that country.³³ On 25 August 1911 a retracement and resurvey of Township No.4 South, Range No.2 East of the Black Hills Meridian was prepared by Wilbur S. Wills, a United States Surveyor. The surveyor recorded the following account:

The surface of this township varies from rolling land, in small areas, to rough, mountainous land.

³² Ira Michaud, 1989; a “Time-line of important dates for Jewel Cave” indicates that in 1910 Calcite from the cave was sold to build part of the Grotto of the Redemption in West Bend, Iowa. Information on the Grotto’s website, www.westbendgrotto.com, indicates that work on the site began in 1912.

³³ 1928 June 23: *Affidavit* filed by Mamie Michaud “upon him so leaving he executed deed to his interest in the above mentioned Jewel Lode Claim to Frank W. Michaud, now deceased, above mentioned, but the said deed was destroyed by accident without having been recorded.”

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The mountainous land is covered with a good growth of pine timber of considerable value for the purposes of adjacent settlers, although not of a quality to give it much value for commercial purposes.

The township is traversed by a number of drains and gulches, or canyons, and some of them are of considerable width and depth. A few water holes are to be found in these drains but, as a whole, the township is very poorly watered; the water even where found usually being of a very poor quality.

The soil on the rolling land is of fair quality while the greater portion of the township is covered with a stony soil of no value for agricultural purposes.

Although there are several cabins in the township, the owners are unknown and have abandoned their holdings, as the township is of value only for grazing purposes.

There are two natural curiosities in the township. Coe Cave, near the north boundary of section 3, is unexplored. Jewel Cave, in the northeast quarter of section 2, has been extensively developed and explored.³⁴

This surveyor's statement provides an interesting description of the area on one day in 1911, and provides hints regarding conditions and use in the time preceding his account. Longer-term observations of the area indicate variations in climate and conditions. Oral tradition relates a story of a perennial stream in Hell Canyon during the 1920s that flowed past the Jewel Cave entrance before disappearing into the limestone bedrock. In the 1980s, Hell Canyon had been dry for decades. In 1995, clear potable water began to flow through the Canyon a few months each spring. From ca. 1997 through ca. 1999, water flowed year round. Since then, water has flowed only during spring thaw and during flash floods subsequent to the Jasper Fire of 2000.³⁵

³⁴ 1911, August 25: *Field Notes of the Retracement and Resurvey of the South Boundary, and Survey of the Subdivision Lines of Township No.4 South, of Range No. 2 East of the Black Hills Meridian in the State of South Dakota*, prepared by Wilbur S. Wills, U.S. Surveyor.

³⁵ *Personal communication*, Mike Wiles, Cave Specialist, Jewel Cave National Monument, 2004.

A 1916 map (**Figure 2.7**) of mineral claims within Harney National Forest was the first to indicate the locations of a road and three buildings associated with the Michaud development. In 1926 Frank W. Michaud died leaving as his heirs his widow, Mamie Michaud and his children, Francis, Ira, Joe, Mary, and Marie Michaud.³⁶

By the time a photograph was taken of the cave entrance ca.1916, the new entrance had been enlarged to the size of a typical doorway (see **Figures 2.8** through **2.11**). The sides and top were supported with wood posts and a beam, and large stones were carefully situated to reinforce the doorway structure. A short trail extended to the south approximately thirty to forty feet from the opening. The trail is defined by horizontal logs along its western edge. The logs likely served as a safety warning for visitors, since the adjoining slope was extremely steep. A pile of stones on the slope appear to be a retaining wall constructed to support the path. Although they could simply be a pile of rocks removed from the cave, the uniform size of the stones, and their neat, linear pattern indicate an organized design. At the southern-most end of the path a set of wood steps lead up the steep rock outcrop. The trail just described appears to be the only one present at the time. **Figure 2.12** provides a conjectural period plan for 1908 through 1928 illustrating the elements documented to exist at the site.

Management by the Jewel Cave Corporation (1928 – 1933)

The spring of 1928 brought new management and developments to Jewel Cave. On 26 April 1928, thirty-eight members of the Custer Commercial Club attended a Lions Club meeting in Newcastle, Wyoming, to discuss opening Jewel Cave to the public. There was no member of the Michaud family enumerated in the list of meeting

³⁶ Mamie Michaud, 1928.

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attendees. After discussing the appeal that the cave would have to potential visitors, and the minimal expenditures that would be necessary to open the cave to tourists, the groups agreed to work together to: secure a lease from the Forest Service; make improvements to the Hell Canyon road; construct a road to the cave entrance; and develop tourist routes through the cave. **Figure 2.13** shows roads in the area including a road in Lithograph Canyon that was met at Lithograph Spring by a road that extended to Jewel Cave. The current highway alignment is north of this road. Also, Mud Springs Road is shown running north/south through the Monument.

The Forest Service agreed to issue a free special use permit to the organizations for the cave, providing that the claim of the Michaud Brothers be addressed. The Jewel Cave Corporation was organized and individuals purchased stock for \$25.00 per share. The money was collected for the purpose of installing ladders, settling the Michaud's claim, and providing a guide for the first season.³⁷

In June, two months after the meeting in Newcastle, Mrs. Mamie Michaud (Frank Michaud's widow) filed an affidavit establishing herself as the sole owner of the Jewel Lode Claim.³⁸ Shortly after that, the Jewel Cave Corporation purchased the claim from Mrs. Michaud, and obtained a lease from the government for about one square mile of land.³⁹ By the end of June the committee appointed by the Commercial Club had already started work on the development of Jewel Cave and the improved

³⁷ 1929, November 18: Toll, Roger W. *Report to The Director*, National Park Service, on Jewel Cave National Monument.

³⁸ Mamie Michaud, 1928. Frank Michaud's widow Mamie Michaud establishes herself as the sole owner of the Jewel Lode Claim.

³⁹ *The Custer Chronicle*, September 20, 1928, 1; and Roger W. Toll, 1929. Toll indicates that the Michauds were paid \$750 for their claim, \$500 in 1928 and \$250 in 1929.

highway would soon be open between Newcastle and Custer.⁴⁰ **Figure 2.14**

illustrates the area indicating the location of Jewel Cave National Monument, the city of Custer, two schools, numerous roads, springs, and creeks, two mines, and nine ranches (including Smith's, Y4, Ninemile, Belmore's, McKinney, Forah's, Tibb's, Richarson, and Collin's ranch) situated between Custer and Jewel Cave.

By the middle of July, 1928, Jewel Cave was informally opened to the public. The road between Custer and Newcastle was complete, and improvements within the cave had reportedly created a "safe and comfortable" passageway for visitors to traverse, "without getting lower than stooping your head and shoulders, through about a mile of passages." "Strong" staircases had been constructed inside the cave where needed to provide easy passage, loose rock and dirt removed, and passages between rooms made larger, all to appeal to visitors. Trained guides were available between 10:00am and 2:00pm to lead tours at the cost of twenty-five cents per person. Potential visitors were encouraged to bring a picnic lunch, or to enjoy the free and "ideal camping grounds" that surrounded the cave.⁴¹ The main focus was on physical improvements during 1928. Despite minimal advertisement, 834 people took the cave tour that year.⁴²

⁴⁰*The Custer Chronicle*, June 28, 1928, 1. The article states that the committee appointed by the Commercial Club had already started work on the development to Jewel Cave. "Passageways are being cleared and some of the most beautiful sights are being disclosed," also, "Work will first be done on the west side of the cave entrance, and it will take only a short time to clear passageways on that side, after which the other branch will be opened. The latter route is probably the most beautiful of all the caves in any National Park. Milky River is one of the greatest curiosities and the wonderful stalactites and stalagmites, vari-colored, are most attractive. The highway being constructed both from Newcastle and from Custer will soon permit uninterrupted travel. A meeting with the Newcastle club which has joined with us in promoting the Cave, will be held soon." The writer of this article has mistaken the left branch for one running to the west, when it actually goes north. This is known as the "Dungeon Room" route. Also, it is unclear if the highway referred to was the historic route to the cave, or another route.

⁴¹*Jewel Cave Open to Visitors*. The News Letter, July 26, 1928, 1.

⁴²*The Custer Chronicle*, September 20, 1928, 1.

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According to one account, a one and one-half mile rough road from the Custer-Newcastle highway to the cave entrance was constructed. By October 1929, this road ended within about a hundred yards of the mouth of the cave, at a location approximately sixty feet *below* the entrance to the cave. This is the only reference to a road approaching from below the cave entrance. It is possible that the road utilized an alignment in the location of the current Hell Canyon Road that extended from the south toward the cave entrance. **Figure 2.15** is a conjectural plan for the period between 1928 through 1933.

In 1929, 2200 visitors paid fifty cents to take the cave tour. The fifty-cent fee covered improvements and running expenses. The entrance fee was allowed by the National Park Service, so long as the surplus was allotted to improvements.⁴³

When Roger W. Toll, then Superintendent of Yellowstone National Park, visited Jewel Cave on 20 October 1929, Mr. Anton J. Snyder, Superintendent of Wind Cave National Park, accompanied him. After taking the cave tour Toll concluded that the cave was of “local and state-wide importance rather than of national interest.” He indicated that while the cave had extensive beautiful formations, the crystals could “hardly hold the continued interest of visitors, to the same extent as ‘drip formations,’” found in other caves.⁴⁴ Despite Toll’s less than enthusiastic report, Jewel Cave was eventually transferred to the management of the National Park Service. On 10 June 1933, Executive Order 6166 transferred the administration of all previously designated

⁴³Roger W. Toll, November 18, 1929. The cave entrance was reportedly at an elevation of 5,289 feet above sea level.

⁴⁴ Ibid.

national Monuments from the United States Forest Service to the National Park Service.⁴⁵

NPS Planning and Design during the 1920s, the Rustic Design Style

By 1917, a “unique American style of landscape design based on indigenous plant materials and naturalistic principles of design” was emerging. This design ethic is commonly referred to as the rustic style and is applied to the treatment of landscapes, structures, and other design elements. Based on the mainstream principles and practices of the American landscape design profession, an emphasis was placed on “subordinating development to natural character and scenic values.” Harmonization of constructed improvements with the natural setting and topography was stressed to preserve and enhance natural character using informal naturalistic design elements. The style’s practitioners emphasized preservation of existing rock formations and vegetation, planting of native vegetation, creation of naturalistic rockwork, development of vistas and viewpoints, and construction of rustic shelters.⁴⁶

In the Midwest, Wilhelm Miller, an advocate for the works of landscape architects O.C. Simonds and Jens Jensen, coined the term ‘prairie style’ to define a new approach to landscape design. Miller attributed the origins of this new design style to Simonds.

Miller credited Jens Jensen with the idea of using the prairie as the inspiration for the landscape design style. “Jensen, inspired by the natural beauty of the Midwest, incorporated fields of wildflowers and used natural and naturalistic features such as waterfalls, brooks, streams, and lakes in his work.” Jensen was a conservationist who

⁴⁵ McClelland, Linda Flint. *Building the National Parks: Historic Landscape Design and Construction*. Baltimore: The Johns Hopkins University Press, 1998, 328.

⁴⁶ *Ibid.*, 328 and 17-18.

worked to preserve areas of historic and scenic interest. He believed that providing urban park visitors with a “vivid out-of-doors experience” would foster in them an “appreciation of nature through assimilated versions of the wilderness.” Jensen and other landscape architects working in the Prairie landscape style “shared the same appreciation and idealization of the midwestern landscape as the architects of the Prairie style of architecture, Frank Lloyd Wright, Walter Burley Griffin, Dwight H. Perkins, Marion Mahoney, and Robert Spencer.” The shared ideals and close working relationships between architects and landscape architects led to a “unity of architecture and landscape” in the Prairie style.⁴⁷

On the west coast, a California style of gardening was emerging that “used plants native to specific climatic zones within the state.” The style was practiced on a residential scale and publicized by Eugene O. Murmann, whose designs also utilized the principles of the Arts and Crafts movement by using native materials and striving to create unity between structures and the natural setting.

Thomas Chalmers Vint became the chief landscape architect for the newly organized NPS Landscape Division in 1927 and at the same time “assumed official responsibility over the location, character, and quality of all park construction.”⁴⁸ Vint embraced this role describing the work of his division:

The work of the Landscape Division . . . is a different character than the general practice of the landscape profession. Although landscape work predominates in the work, it merges into the field of architecture. We have little use for landscape men whose experience is limited to the planting of shrubbery and allied to landscape work. There is little planting done within the National Parks and what is done is limited to the transplanting of native shrubs and trees, so the general commercial stock is not used. The

⁴⁷ Ibid., 61-66.

⁴⁸ Ibid., 197.

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work has to do with the preservation of the native landscape and involves the location and construction of communities, buildings, etc. within an existing landscape.⁴⁹

Under the direction of Vint the NPS landscape program expanded into a process of park planning and development focused on rustic style principles emphasizing landscape preservation and harmonious design.⁵⁰ The rustic design style was embraced and developed by the National Park Service into a rustic park design style.

Support for the design ethic was widespread. In 1938 Arno B. Cammerer, Director of the National Park Service, emphasized the link between preservation of natural beauty and the development of facilities within National Parks.

In any area in which the preservation of the beauty of Nature is a primary purpose, every proposed modification of the natural landscape, whether it be by construction of a road or erection of a shelter, deserves to be most thoughtfully considered. A basic objective of those who are entrusted with development of such areas for the human uses for which they are established is, it seems to me, to hold these modifications to a minimum and so to design them that, besides being attractive to look upon, they appear to belong to and be a part of their settings.⁵¹

The elements constructed as implementations of the rustic park design style established a durable “visual identity for national and state parks and reflected an

⁴⁹ Job Analysis, Assistant Landscape Architect, n.d., ca. June 1928, Record Group 79, National Archives, Washington, D.C. This quote was cited in McClelland, 1998, 199.

⁵⁰ Linda Flint McClelland, 1998, 196.

⁵¹ Good, Albert H. 1999. *Park and Recreation Structures*. (New York: Princeton Architectural Press, a reprint of the 1938 edition published by the United States Department of the Interior, National Park Service), foreword to the original edition by Arno B. Cammerer, then director of the National Park Service, VII.

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equally robust sense of purpose for the parks.”⁵² This style was advanced by the large-scale implementation of projects by the CCC during the 1930s.

CCC Design Approach During the 1930s

Projects funded by the PWA emphasized construction however, the work had a “strong relationship to the landscape design of the parks.”⁵³ The projects were based on master plans that focused on the broader issues of site development and principles for landscape protection and harmonization of park development. Also, many individual functional structures, including comfort stations, privys, roads, and maintenance buildings, became important landscape features. Designs for the western division were produced by the Branch of Plans and Design, under the direction of Thomas Vint, in the San Francisco office. Designs and working drawings for western parks, including Jewel Cave, were prepared by the San Francisco office.

The National Park Service utilized PWA funds for a wide variety of construction projects including patrol cabins, fire lookouts, gates, steps, utility systems and visitor facilities. From 1933 to 1937 the Western Division received 185 PWA allotments. The emphasis for these projects was placed on “principles of landscape protection and harmonious design.”⁵⁴

⁵² Ibid., foreword to the 1999 edition by Randall J. Biallas, Chief Historical Architect, National Park Service, i.

⁵³ Linda Flint McClelland, 1998, 330-333.

⁵⁴ Ibid.

**National Park Service Management and Federal Relief Development
Projects at Jewel Cave (1933-1939)**

Jewel Cave began a new era in 1933. Its newly appointed administering agency, the National Park Service, took a different approach to managing lands than the Forest Service. Since its creation in 1916 the National Park Service had focused on its mission to “conserve the scenery and the natural and historic objects and the wild life therein and... provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”⁵⁵ The recreation and enjoyment of visitors was placed on an equal level with the conservation of resources.

Since its designation as a national Monument in 1908, Jewel Cave had received practically no federal funding or federally-directed management. In fact, the only Federal activity that involved the Monument during its first twenty-five years of existence was the granting of a request by the Jewel Cave Corporation for a lease to develop and promote the property. Two major events occurred in 1933 that brought an influx of governmental attention to the site. By shifting management from the Forest Service to the National Park Service, the wheels were set in motion for more emphasis to be placed on providing access and amenities for visitors to the Monument. Also, beginning in the spring of 1933, New Deal programs were authorized throughout the nation making possible the development and improvement of national parks at an unprecedented level.⁵⁶

⁵⁵ Ibid., 1.

⁵⁶ Ibid., 327.

The effect at Jewel Cave was immediate. By July 1933, a federally funded project referred to as the “Custer-Wind Cave park approach roads,” was underway. The project involved widening, re-grading, and surfacing Highway 16, providing a comfortable route to Jewel Cave from Custer and Newcastle.⁵⁷ Illustrations of Hell Canyon before and during the construction of Highway 16 are provided in **Figures 2.16** through **2.22**.

During the summer of 1934, Emergency Conservation Work (ECW) Company 2754, Camp NP-1 was established at Wind Cave National Park. During the next year crews from the Wind Cave camp undertook projects at Jewel Cave. The ECW was the predecessor of the Civilian Conservation Corps (CCC). The workers traveled back and forth between the two sites each day until a side camp was set up at Jewel Cave.⁵⁸

On 20 May 1935 a “spur camp” or “side camp” from the Wind Cave ECW camp was established at Jewel Cave.⁵⁹ The side camp was located near the site of the current parking lot at the historic area (see **Figures 2.23 – 2.25**). A park road followed roughly the alignment of the existing road, with a loop at the southern end. A tent located to the south of the loop in the road served as housing for the park ranger. A pedestrian trail led from the ranger’s tent to the loop road, then continued in a winding pattern toward the south west, then made a sharp curve near the site of the proposed Ranger Cabin, and continued northwest to the cave entrance. Another trail led from the cave entrance down to Hell Canyon, including stairs.

⁵⁷ *The News Letter*, July 6, 1933, 1. “New Highway By Jewel Cave Will Be Opened For Travel By Middle of July: Work on Newcastle-Custer Road in South Dakota Progressing Rapidly in Forest Section.” The road improvements were made through contracts with private highway contractors.

⁵⁸ Kenneth W. Karsmizki, 1993, 6. (Karsmizki indicates that the camp was established at WICA in July 1934).

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The Michaud hotel and associated structures were demolished by the ECW in 1934. The buildings were reportedly burned and the remains removed from the area to an unspecified location.⁶⁰

By June 1935 a 2-inch pipe line had been installed from the spring to a “reservoir site” with a branch line to the side camp.⁶¹ **Figure 2.24** illustrates the locations of the CCC side camp, the ranger’s tent, the proposed cabin site, and a drinking fountain near the “existing trail” leading to the cave entrance. Although the drinking fountain is referred to, its location is not indicated on the plan. It is possible that it was never installed. Work continued on the reservoir through January 1936 when the 3,000 gallon capacity reinforced concrete structure was completed and “back filling and landscaping were completed to make this reservoir almost invisible.” Work began immediately on constructing a cesspool and sewer system that was completed in January.⁶²

In 1935 the Jewel Cave ECW crew constructed a rustic log Ranger Cabin for use as an administrative office building. The cabin was placed on the National Register of Historic Places in April 1995. It has had several names, including Ranger Cabin, Old Administrative Office Building, Ranger Station, Building No.1, and Residence No.1.⁶³ In this report it is referred to as the Ranger Cabin. It initially provided office space and living quarters for a temporary ranger to be stationed at the park during the

⁵⁹ Evans-Hatch, Michael, unpublished notes, part of research for a Historic Resource Study for Jewel Cave National Monument, 2004, 1. Notes from 5 June 1935, “Report to the Director, National Park Service” from the Superintendent of Wind Cave National Park.

⁶⁰ Ira Michaud, 1989.

⁶¹ Evans-Hatch, Michael, unpublished notes prepared for the National Park Service as part of a Historic Resource Study for Jewel Cave National Monument, 2004, 1.

⁶² Ibid.

⁶³ O’Bright, Alan W. *Rugged Charm: Ranger Cabin (HS-1) Historic Structure Report, Jewel Cave National Monument*, 1999, 18.

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summer months. Although the log structure was erected in 1935, the interior finishes were not completed until sometime in 1938. The log joint daubing and interior finishes were delayed until the logs had time to season. The cabin was probably occupied quickly after its completion, and it appears to have been operational as an administrative office during the summer season of 1938.⁶⁴ During the summer of 1936 the crew spent several days transplanting shrubs around the Ranger Cabin.⁶⁵ The 1999 *Historic Structure Report* for the cabin provides a complete history of changes made to the interior and exterior of the building.

The Ranger Cabin included a living room/office, kitchen, storage closet, bedroom, bathroom, public restrooms (with separate exterior entrances for men and women), and porch. The cabin was occupied as an office/residence from ca. 1938 through the late 1950s. Only minor changes were made to the structure until the 1980s when repairs included extensive interior alterations. The public restrooms are notable in that they appear to be the only permanent public sanitary facilities to have served the area since the cabin was constructed. No privies are indicated on any of the plans for the site.

In November 1935 a barracks and mess hall were moved from Wind Cave to the Jewel Cave side camp to be used by workers at the site. The barracks had toilet facilities, a wash room and showers by January of 1936.⁶⁶

In addition to the water system and the Ranger Cabin, the CCC crew constructed an eight-hundred foot long trail that led from the entrance road to the Ranger Cabin and the cave entrance. One hundred yards of dirt and gravel fill were

⁶⁴ Ibid., 18-19.

⁶⁵ Evans-Hatch, Michael, unpublished notes, 2004, 2.

⁶⁶ Ibid., 1.

placed along the shoulder of the trail in January 1936. During the following summer an iron gate was installed at the cave entrance and the “old ramshackle buildings” at the cave entrance were removed.⁶⁷

Construction drawings for “Jewel Cave National Monument, Proposed Foot Trail and Masonry Steps, Headquarters” were approved in November 1935 (see **Figure 2.28**). The plan indicates the location of an existing trail to the cave entrance, and the proposed trail, which roughly follows the route of the extant trail. The trail existing in 1935 approached the cave entrance more directly from the east, ending in a set of wood steps adjacent to the southeastern side of the cave entrance (see **Figure 2.29**). The trail also continued down toward the west. The plan also indicates that the ranger’s tent was located in the general vicinity of the former campground, and the proposed location of the Ranger Cabin (administrative building) is shown. The building was constructed soon after this drawing was approved (see **Figures 2.31-2.34**).

In February 1936 a survey was made of the cave trails and notes of the survey were prepared by assistant engineer Wohlbrandt.⁶⁸ The crew surveyed the cave passageways and made preparations for “slight improvements” to the cave trails (see **Figure 2.26**).

During 1937 a gravel trail was constructed between the parking area, the Ranger Cabin, and the cave entrance.⁶⁹ In June 1938 the need for stairs to “overcome the change in elevation along the trail leading from the Custodian’s Residence to the

⁶⁷ Ibid., 1-2.

⁶⁸ Ibid.

⁶⁹ Kenneth W. Karsmizki, 1993. Karsmizki cites NA, RG79, Monthly Narrative Report, S. Serrano, May 20 to June 20, 1937.

Cave entrance,” was cited in a field trip report.⁷⁰ In July a monthly narrative report mentioned that fill used in the area near the cave entrance was obtained from the highway construction project, and that “top soil, duff, and planting material” were to be used to bring the “slope to a natural condition” (see **Figure 2.30**).⁷¹

This approach was in accordance with the NPS treatment of road banks and steep slopes. “Though many slopes quickly reverted to natural conditions, erosion on newly cut and shaped slopes was a constant concern. At the same time that Vint’s staff was developing ways to blend road banks into the scenery by rounding and flattening the slopes, they became interested in the possibilities of speeding up and controlling the process of revegetation by planting or sodding the finished slopes. Practical concerns about erosion, maintenance, and visibility were coupled with an interest in returning the roadsides to a scenic and naturalistic appearance. Planting roadsides added to their beauty and created a pleasing sequence of effects, particularly where there were no distant views.”⁷²

A second construction drawing for “Stone Trail Steps” along the cave trail was prepared by C.D. Carter of the Region II Branch of Plans and Design and approved by the Regional Landscape Architect, Howard W. Baker, the Coordinating Superintendent, Harry J. Liek, and the Regional Director, in mid-September 1939.⁷³ This plan indicates that a set of wooden steps were present, and that the masonry steps approved in 1935 were never constructed. The 1939 drawing reveals some interesting details of the design of the steps (see **Figure 2.27**). Notes regarding the hand-placement of native sandstone rocks, and shaping of the stone steps to respond

⁷⁰ Ibid., Cites NA, RG79, Field Trip report June 4 to 23, 1938.

⁷¹ Ibid., Cites NA RG79, Monthly Narrative Report, Lloyd Fletcher July 20 to August 20, 1938.

⁷² Linda Flint McClelland, 1998, 207.

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to the native rock walls, indicate the influence of a skilled designer who was sensitive to the aesthetic qualities of the indigenous materials, and the inherent beauty of the natural rock crevice. The design directed that a dead tree lying over the trail not be disturbed and existing trees become integral features along the trail's edge. On 30 September 1939, the Wind Cave CCC camp was disbanded.⁷⁴

The First NPS Master Plan for Jewel Cave (1940 – 1956)

NPS Design Approach during the 1940s

The approach used for planning at Jewel Cave mirrored that of the NPS nationwide, and presents an excellent example of the applications of changing NPS planning and design philosophies. As the value of recreation to American life and the relationship between conservation and recreation became solidified, public administrators, park designers, and landscape architects responded in their planning approach. As the number of parks increased, and their accessibility and visitor services improved, visitation in national parks grew tremendously in the late 1930s.⁷⁵ The federal stance on the relationship of conservation and recreation held that “conservation for recreation is conservation in its broadest aspects,” since it was seen to preserve both the intrinsic values of areas of scenic, scientific, and historic importance, as well as providing for the “proper use of these values to meet human requirements.”⁷⁶ Planning was viewed as “critical to successful park design, and natural areas required that design be subservient to the natural character of an area

⁷³ The park was in Region Two in 1939. It is now in the Midwest Region.

⁷⁴ *National Park Service News Release*, April 10, 1936.

⁷⁵ Linda Flint McClelland, 1998, 455.

⁷⁶ Ibid. McClelland cites Paul V. McNutt, “Conservation for Recreation: The Landscape Architect as Land Use Planner in Public Works,” *Landscape Architecture* 30, no.4 (1940): 174.

and that the work of the landscape designer be simple, understated, and naturalistic.”⁷⁷

1942 Master Plan

The first Master Plan for Jewel Cave National Monument was prepared in 1942 (**Figures 2.37-2.39**). The plan directly reflected the then-current NPS philosophy of providing increased recreational facilities and development at the site. The master plan included a new campground for visitors, and increased facilities for employee housing, administration, and maintenance. A conjectural Historic Period Plan for 1940 through 1956 is illustrated in **Figure 2.41**.

A field survey conducted in October 1942 resulted in the production of a topographic map illustrating existing site conditions. It includes the sizes of trees in the area between the parking lot and the Ranger Cabin, as well as along the first portion of the trail to the cave entrance (see **Figure 2.36**). The plan indicates that a trail approached the Ranger Cabin from the parking lot, then continued to the southeast toward the cave entrance. At the Ranger Cabin (administration building) the trail included three side paths. One led to the front door, the second led to the door to the women’s toilet room, and the third led to the men’s toilet room. The drawing also indicates the location of the parking area, to the northeast of the cabin and trail.

A 1942 Headquarters Area Plan (**Figure 2.38**) indicates that a utility area including one permanent employee’s residence, a storage building, a fire equipment building, and outdoor utility use area were planned for a site southeast of the Ranger

⁷⁷ Linda Flint McClelland, 1998, 455.

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Cabin. The campground had seven spaces, and two outhouses. Day-visitor parking was provided in three locations along the main loop road. The typical campsite was envisioned in the NPS standard unit of the day (**Figure 2.38**).⁷⁸ An entrance sign was erected at Highway 16 by 1942 (**Figure 2.35**).

By the time a park brochure was published in 1945, Jewel Cave was open every day of the week during the entire months of May through September, and included a public campground with free wood and spring water. A fee of 50 cents was charged for cave tours, which began every hour from 8 a.m. to 4 p.m. The proximity of the park to other nearby national attractions, including Wind Cave National Park, Mount Rushmore National Memorial, Custer State Park, and Devils Tower National Monument were cited in the brochure as added incentives to visit the area. The brochure map indicated that the historic area included a loop parking area and a campground, as well as the Ranger Cabin (the log ranger station) and the trail to the cave entrance (see **Figure 2.40**).⁷⁹

During the 1946-1947 fiscal year, the Monument hosted 10,211 visitors, 9,743 of whom made the cave trip. The previous year the park hosted only 1,748 visitors. By 1947 the park entrance road and parking area were paved in gravel and considered to be in good condition, although quite dusty during dry weather. The surface trails were in good condition (the surface treatment at the time is unknown), and the Ranger Cabin was in good shape structurally.⁸⁰

⁷⁸ *Headquarters Area Plan*, Part of the Master Plan for Jewel Cave National Monument, From NPS Data as of January 1, 1942.

⁷⁹ United States Department of the Interior, National Park Service, 1945. *Jewel Cave National Monument, South Dakota*. Park Brochure including a map dated April 1945.

⁸⁰ *Coordinating Superintendent's Annual Report for Jewel Cave National Monument*, 1947.

A 1948 photograph indicates that the southeast side of the building (left side) was used for parking at least one vehicle, probably the Ranger's vehicle. The trail to the Ranger Cabin from the parking lot appears to be surfaced with compacted earth, and informally edged with medium sized rocks. The rocks define a secondary path parallel to the northeast (right) side of the building (see **Figure 2.44**). This path may have been a portion of the original path to the cave.⁸¹

1950s Master Plan

A 1951 plan of the Headquarters Area indicates a small square storage building was located to the southeast of the curve in the surface trail that led to the cave entrance. The map indicated that this item was to be obliterated.

A General Development Plan for Jewel Cave was prepared by H.P. Benson in January 1961. It was the first to give physical form to the idea of moving the park headquarters from the original location. The plan includes a new Monument boundary, shifted to include the cave area explored. Herb and Jan Conn began exploring the cave in 1959. Their efforts showed that much of the cave extended to the east of the original boundary. Their efforts led to a new park boundary, a new tour route, a new cave entrance, and a new Visitor Center at the Monument. The boundary revision was equivalent to an acre-for-acre land exchange. A new headquarters, housing, and maintenance area are indicated on the plan, located to the southeast of the historic headquarters (see **Figure 2.46**). Although it would be over five years

⁸¹ Bitz, Bruce. August 1988, Oral interview with Shirley Wolf. Ms. Wolf's husband, Elwood Wolf, was the first permanent ranger at Jewel Cave. The couple arrived at the park in August 1941 and lived in the log Ranger Cabin during the summer season until August 1943. They also lived in the cabin during the winter of 1942.

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before the groundbreaking for the new visitor center, the plan laid out in 1961 corresponds closely with the later development in the new area.

In 1952 three seasonal rangers were employed by the park. The administration and responsibility of the Monument was placed under the Superintendent of the Black Hills Areas Office in Rapid City. Approximately 15,688 visitors came to the park and 4,481 made the cave trip.

During the year, four cattle-guards were built at the Monument boundaries on the Hell Canyon road and truck trail. These are horizontal grates in the road that cattle will not cross over. A radio and telephone system was installed for the Monument, including a power house building with portable light plant, radio poles and antenna. The system included four telephones with three in the cavern and one in the headquarters office. Communication by radio to Wind Cave and Rapid City were in operation at the end of the fiscal year. In 1952 the entrance road that led from the highway to the parking area was reconstructed and surfaced, including the parking area and a spur road to the proposed residence and utility area. An entrance control gate was installed, and campground signs were constructed and installed. The Superintendent reported that the water supply system was becoming unreliable. The need for a permanent residence for the area was urgent.⁸²

In 1953 a small cabin building (building #24) was moved from Wind Cave National Park to Jewel Cave to provide seasonal ranger quarters.⁸³ During 1953, 16,458 visitors entered the campground and headquarters area and approximately

⁸² Like, Harry J. *Coordinating Superintendent's Annual Report for Jewel Cave National Monument*, 1953. The cattle guards mentioned are believed to be the horizontal grates in the Hell Canyon Road. These would provide vehicular access while deterring cattle when combined with fences that enclosed the Monument.

⁸³ *Superintendent's Annual Report for Jewel Cave National Monument*, 1954.

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5,000 took the cave tour. Three seasonal park rangers and naturalists conducted the trips and also provided Monument protection, interpretation, campground maintenance, refuse disposal, and minor maintenance jobs. No major construction projects were performed during the year. The Superintendent's annual report stressed that a permanent residence was urgently needed, and that considerable building maintenance, cave trail maintenance, and Monument sign construction were necessary to bring the Monument's facilities up to a high maintenance level.⁸⁴

During the 1954 season the Monument was staffed by four seasonal employees. The need for a permanent ranger continued. During the off-season (24 September 1954 through 29 May 1955) monthly protection and inspection patrols were conducted by staff from Wind Cave National Park. Jewel Cave now had a Park Fire Chief headquartered at the park, a high pressure tanker, and a small fire tool cache. Cave entrance fees continued at fifty cents. The park maintained five buildings, one house trailer, and water, sewer and light systems. During the 1954-1955 travel year 6,718 visitors registered at the park. The public campground was heavily used and in a bad state of repair due to inadequate funding. Asphalt was applied to the foot trail from the parking area to the Ranger Cabin. A new public drinking fountain was installed (this replaced an older drinking fountain in the same location —its implementation date is not known). The water line to the campground was repaired and placed in operation for the first time since 1950. Dangerous trees and snags were removed from the Headquarters Area. Reservoir and spring area catch basin manhole covers were

⁸⁴ Like, Harry J., Earl Semingsen, and Richard T. Hart. Coordinating Superintendent's Annual Report for Jewel Cave National Monument, 1954.

replaced as recommended by the US Public Health Service to prevent water contamination to the system.⁸⁵

A 1955 roads and trails plan for the park indicates a proposed utility area at the end of the road on the north side of the Ranger Cabin (see **Figure 2.42**). During 1955, 8,254 visitors took tours at the park. Heavy rains in August caused erosion problems in the campground and on the surface trail to the cave. A new entrance sign was installed and the area near the park entrance was cleared of rock and mowed. Use of the campground continued to increase. The superintendent expressed concern that visitors missed the entrance, even with the new entrance sign. The trail between the Ranger Cabin and the cave entrance was resurfaced. Nine steps were added to the outside trail and a rock retaining wall was built to stop “short-cutting” and to keep soil from washing onto the lower trail. The edges of the new trail were “feathered” with black dirt and this was seeded to grass.⁸⁶

Mission 66 (1957 – 1972)

Mission 66 was a National Park Service-wide initiative to update facilities, visitor services, and maintenance within the parks. The program had a direct impact on Jewel Cave, ultimately resulting in the development of the existing visitor center, cave elevator, administrative headquarters, and housing area. A conjectural Historic Period Plan for 1957 through 1972 is illustrated in **Figure 2.52**.

During 1956 over 20,000 people visited Monument, and 8,649 took cave tours. Over 1,300 people camped at the park. A windstorm damaged over 600 trees in the

⁸⁵ Semingsen, Earl M. and Richard T. Hart, *Annual Report for Jewel Cave National Monument*, 1955. The Ranger Cabin was referred to as the “headquarters building.”

⁸⁶ *Annual Report of Operation of Jewel Cave from Ranger Naturalist in Charge, Jewel Cave, to Superintendent, WICA, 1956.*

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Monument in November. A new “pylon” cave entrance sign was installed at the park entrance road, and 26 directional and labeling signs were constructed to be installed at the park. Throughout the rest of the decade attendance to the park, and use of the campground grew. In 1959 rangers gave evening slide talks at the campground. In 1959 the water supply from the spring began to be inadequate to serve needs at the site.

A new era of cave exploration began at Jewel Cave in 1959 when Dwight Deal obtained a permit to explore and map the cave and to study its geology. He was joined by Herb and Jan Conn whose life work and passion became the exploration of Jewel Cave. The three worked together until 1961 mapping 5 miles of passageways. After that, Deal moved from the area and the Conns continued mapping and exploring Jewel Cave for another two decades, retiring in 1981 after discovering more than 65 miles of cave passages. Caving parties led by the husband-and-wife team made 708 trips into the cave and logged over 6,500 hours each exploring and mapping. Their discoveries led them to recommending that the National Park Service excavate a second entrance to the cave, so that the high vaulted ceilings and colorful crystal displays could be revealed to the public. The Conns helped to plan the new tour route and install the electric lights to accentuate the natural characteristics of the cave. Initially, a plan included creating a tunnel from Lithograph Canyon, however, NPS personnel determined that sufficient parking space for visitors could not be provided in the Canyon. A tunnel was completed in 1966. The elevator shaft was completed in

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1967, and the elevator was installed in 1972. The new “Scenic Tour” opened to the public in 1972.⁸⁷

During the 1960s while the Conns were exploring and mapping new areas in the cave, NPS personnel continued to lead visitors through the historic cave tour. As visitation increased, changes occurred to the landscape surrounding the Ranger Cabin and the historic cave entrance. In 1961 the water to the campground had to be turned off due to the dwindling supply. In 1962 a submersible pump was installed. In 1963 a septic tank and filter field were constructed to handle the sewage from the “temporary headquarters facilities.”

In 1963 visitation at the Monument exceeded 45,000 people. During 1964 visitors had to be turned away because the cave tours were often filled to capacity. In 1964, the Monument received national publicity due to Herb and Jan Conn’s discoveries of new portions of the cave. Visitation continued to grow. The Superintendent’s Annual Report in 1964 stated that additional cave guide personnel and development for public use of the newly discovered cave passages were urgently needed to meet the public use demand.⁸⁸

Based on discoveries made by the Conns, the NPS pursued a change in the Monument boundary to reflect the location of the cave passages that had been discovered. In 1964 a meeting of NPS and US Forest Service officials was held and an agreement at the local level regarding an adjustment to the Monument boundary was reached. Preparation of a new Master Plan for park development was underway.

⁸⁷ Palmer, Arthur N. *Jewel Cave: A Gift from the Past* (Black Hills Parks and Forests Association, Wind Cave National Park, Hot Springs, South Dakota), 1999, 6-8; and Herb and Jan Conn, *The Jewel Cave Adventure* (Revised printing, St. Louis, Missouri: Cave Books), 1991; and *Jewel Cave National Monument: Official Map and Guide* (U. S. Department of the Interior, National Park Service, no date).

⁸⁸ Lombard, Jess H. *Superintendent’s Annual Report for Jewel Cave National Monument*, 1964.

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Exploration of the cave was suspended due to the perceived potential danger involved in removal of an injured person from the back portions of the cave.⁸⁹ Cave tour visitors increased so much that it was not possible to provide conducted tours of the cave for all those who wished to take one. Additional temporary parking spaces for fifteen cars were constructed to help alleviate the overcrowded parking lot. The surface trail to the cave entrance was resurfaced with asphalt and handrails were installed. A ticket kiosk was brought to the site from Wind Cave and installed in front of the Ranger Cabin to alleviate crowding in the office.⁹⁰

By the mid-1960s, it was apparent that most of the known cave was located beyond the Monument boundaries and inaccessible to most visitors through the existing historic entrance. In response to this problem, a land exchange bill—PL 89-250 (79 Stat. 971)—was enacted by Congress and signed by President Johnson on 9 October 1965. The Monument and the Black Hills National Forest exchanged an equal amount of acreage; the area added to the Monument was determined to correspond with the known cave. Only 11% of the original Monument was retained in the boundary adjustment.⁹¹

In 1965 work began on the new visitor center and administrative complex. Contracts were awarded for the construction projects and test borings were drilled to determine the location for the elevator shaft. Construction continued through 1972 when the new area was opened to the public.

In 1967 the natural rock cliffs around the historic cave entrance were altered. Experienced rock climbers removed portions of rock to reduce the danger of injuries

⁸⁹ Ibid.

⁹⁰ Ibid.

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to visitors. The Monument ticket booth was expanded to provide better public contact opportunities. Topsoil and seed were applied to the area immediately surrounding the Ranger Cabin to restore vegetation in this trampled site.⁹²

On-going Management of Jewel Cave by the National Park Service (1972 – 2004)

Once the new visitor center and administrative area was open in 1972, development pressure on the historic area began to subside. Use of the campground was discontinued before 1979 and the management of the property as a historic area was implemented. Eventually, sometime after 1982, the housing and administrative buildings were removed from the historic area, leaving only the pump building and the Ranger Cabin. The upper trail to the cave entrance and the stone steps along that trail were altered during this period. The asphalt trail was paved with concrete and changes were made to the stone steps.⁹³ The preparation of an updated General Management Plan in 1994 solidified the policy of treating the original cave headquarters area as a historic property.

A *Historic Structure Report* (HSR) was completed for the Ranger Cabin in November 1999. The report recommends that the Ranger Cabin interior and exterior be restored to its circa 1940 appearance and used for programmed interpretation of activities at the site during that period. Based on the recommendations made in the HSR, the Ranger Cabin exterior was restored and repaired to a circa 1940s appearance. Two of the interior rooms were restored to a circa 1940s appearance.

⁹¹ *Final General Management Plan and Environmental Impact Statement, Jewel Cave National Monument* (United States Department of the Interior, National Park Service) 1994, 1.

⁹² *Superintendent's Annual Report for Jewel Cave National Monument*, 1967.

⁹³ Mike Wiles, Cave Specialist, Jewel Cave National Park, was present at the time the work occurred. He recalls that additional steps were added and that some of them were added in pairs -- previously they had been single steps only.

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The two public restrooms were adapted to shelter fire suppression equipment and detection and electrical panels. The project was completed in 2001.⁹⁴

The Jasper Fire

On 24 August 2000, a forest fire was reported north of Highway 16 about two and one-half miles west of Jewel Cave National Monument. The fire quickly spread into the park and beyond, overwhelming all containment efforts. Fire behavior included crowning, spotting and running in rough canyons.⁹⁵ By the end of the day on 28 August, over ninety percent of Jewel Cave National Monument had burned, and approximately fifty percent of the trees were lost, but all structures had been protected.⁹⁶ The historic Ranger Cabin was foamed on three occasions by fire crews as the fire burned all around it. Fire management efforts, including prescribed fires and thinning around the headquarters area buildings in 1996 and 1999, were credited with contributing greatly to the protection of those structures. During the time that the fire was burning in the area of the administrative offices, some valuable items were placed inside the cave, 270 feet below the surface, to protect them from the fire. The fire

⁹⁴ Alan W. O'Bright, 1999.

⁹⁵ *Fire and Aviation Management, Terms and Definitions* (U.S. Department of the Interior, National Park Service, digital version at: ata2.itc.nps.gov/fire/index.cfm). According to the terms and definitions, a fire crown, or crowning, is the "movement of fire through the crowns of trees or shrubs more or less independently of the surface fire." Spotting refers to "behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire." Running indicates a "rapidly spreading surface fire with a well-defined head."

⁹⁶ An archeological site, the timber-supported dugout located on the floor of Hell Canyon in the hillside, was damaged by the fire. Sheveland documented this feature along with archeological site 39CU1314, Hell Canyon Cabin. In 1998, there was a dugout in the hillside nearby that was supported by timber supports. During Williams' site visit in 2003, these timbers were no longer apparent. They were burned during the Jasper fire in 2000. It is possible that the dugout structure was used to store dynamite for CCC construction projects. Sheveland, Genna J. *A Level III (Intensive) Cultural Resource Survey of Jewel Cave National Monument*. Custer, South Dakota: United States Department of the Interior, National Park Service, 1998.

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continued to spread, devastating area forests, until it was contained on 8 September 2000. The fire burned 83,508 acres of the Black Hills National Forest.⁹⁷

The impacts of the Jasper Fire were still clearly visible at Jewel Cave in 2003. The intense heat of the fire wiped out all vegetative material (including evergreen trees) in large areas. Seeds of pest species including prickly lettuce and Canada thistle were abundant in the ground layer of some of these areas in 2003. Restoration management of the damaged ponderosa pine ecosystem is a continuing issue for the park.

⁹⁷ *Jasper Fire Binder*, daily summary of the Jasper Fire found in the Jewel Cave National Monument library.

CHAPTER II: SITE HISTORY
ILLUSTRATIONS

Cultural Landscape Report and Environmental Assessment

Jewel Cave National Monument

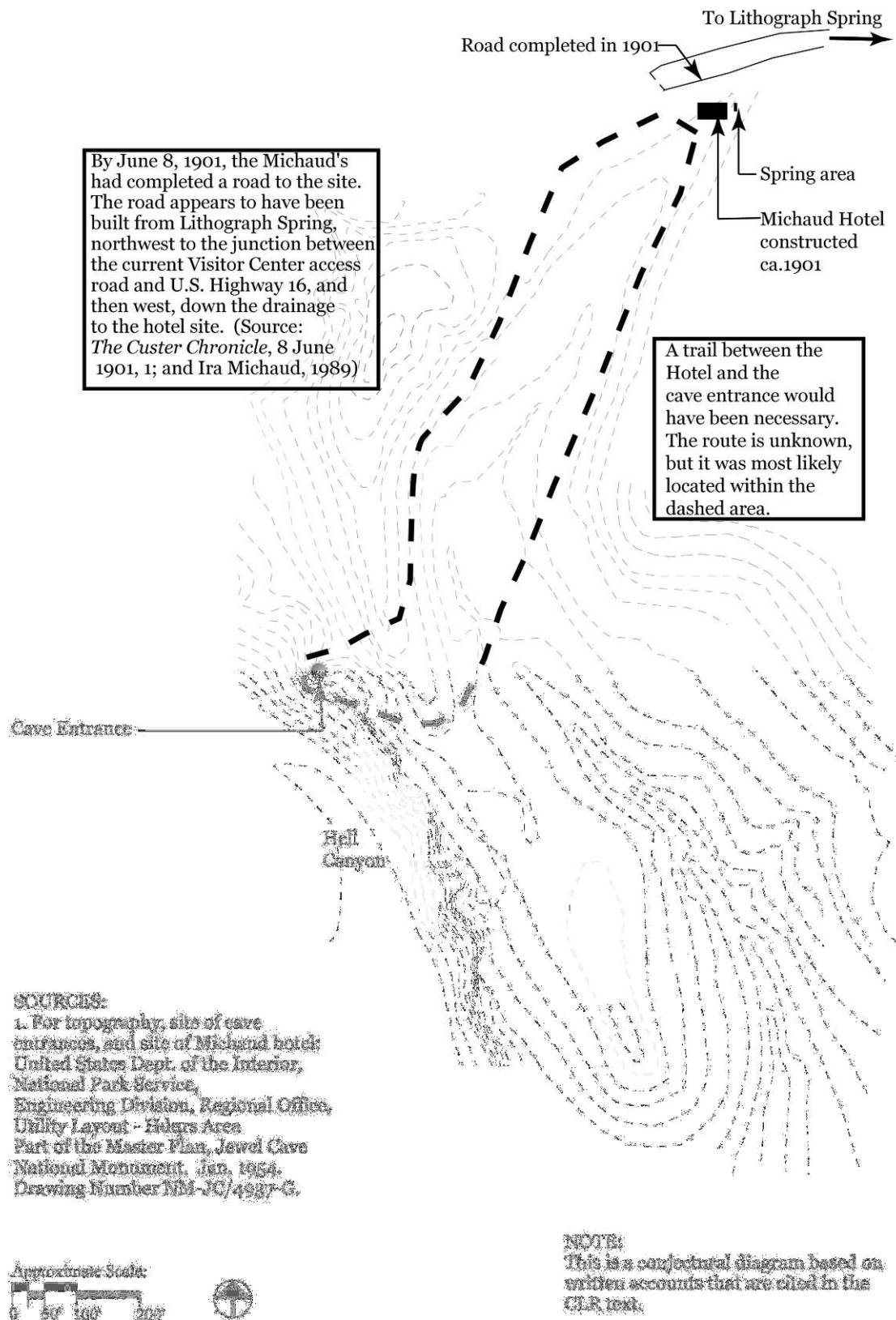


Figure 2.1: Historic Period Plan, 1900-1908



Figure 2.2: The Michaud Hotel, after 1905 (Source: JECA 1803)



Figure 2.3: Michaud Hotel 2, after 1905 (Source: JECA 1801)

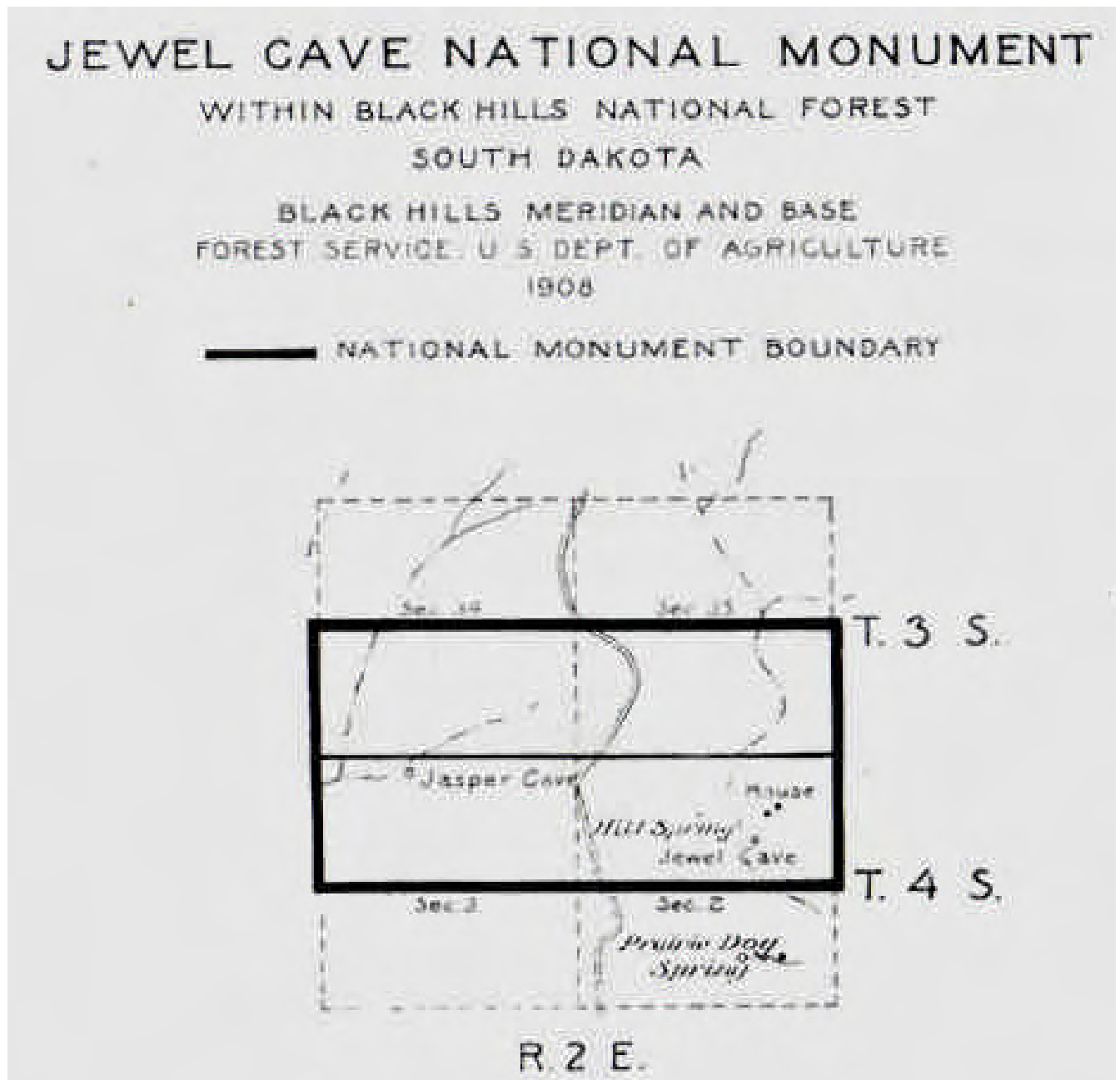


Figure 2.4: Jewel Cave National Monument Boundary, 1908 (Source: NPS, files at JECA). The house and another structure are indicated, as well as the entrances to Jewel Cave and Jasper Cave. The road in Hell Canyon is present, however, no road is indicated near the Michaud Hotel (labeled “house” on the plan).

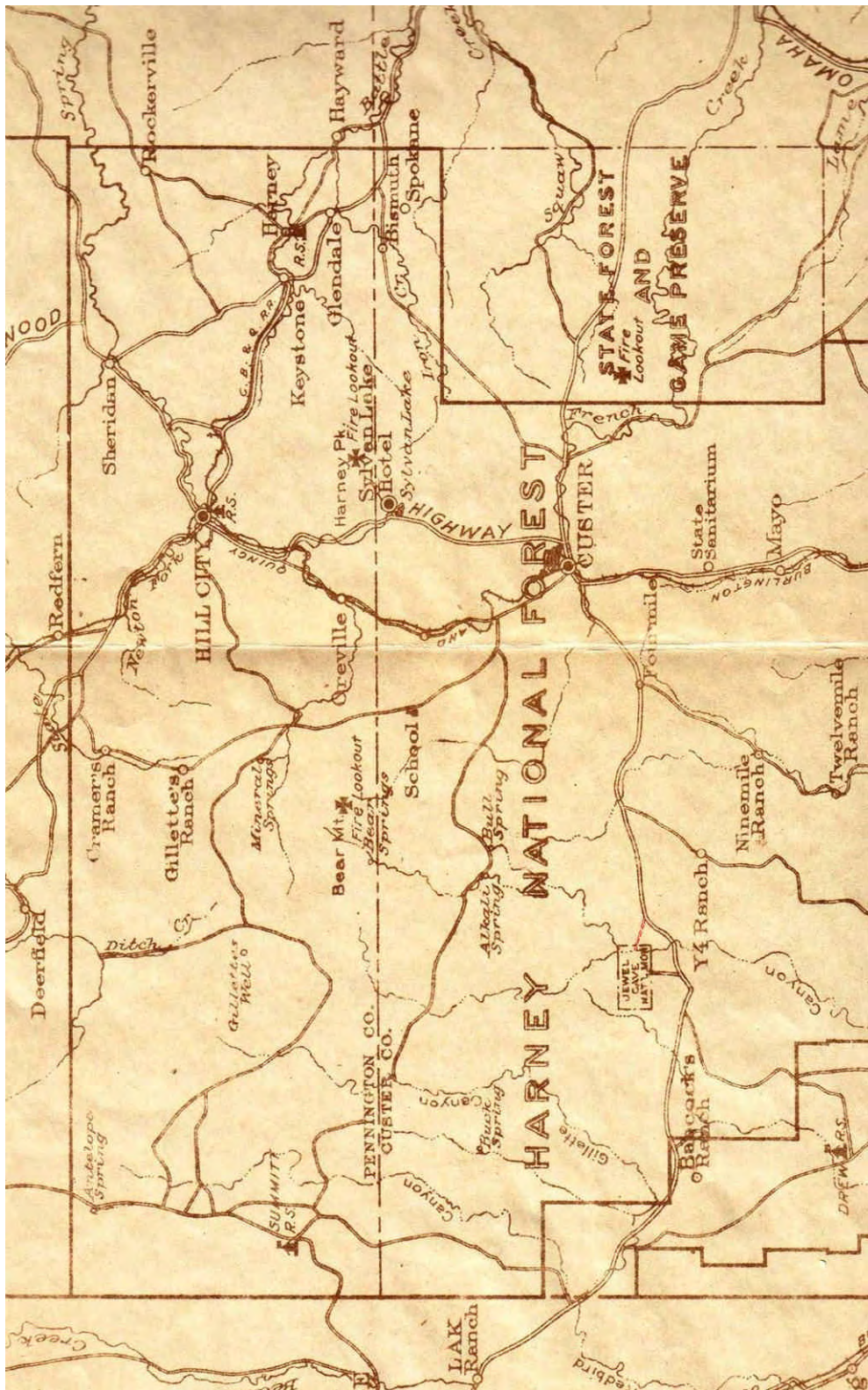


Figure 2.5: Forest Service Map, Date unknown, after 1910 (Source: JECA 1655)



Figure 2.6: Forest Service Map Detail, Date unknown, after 1910 (Source: JECA 1655). The map identifies only one road, on the west side of Hell Canyon, providing access to the Monument.

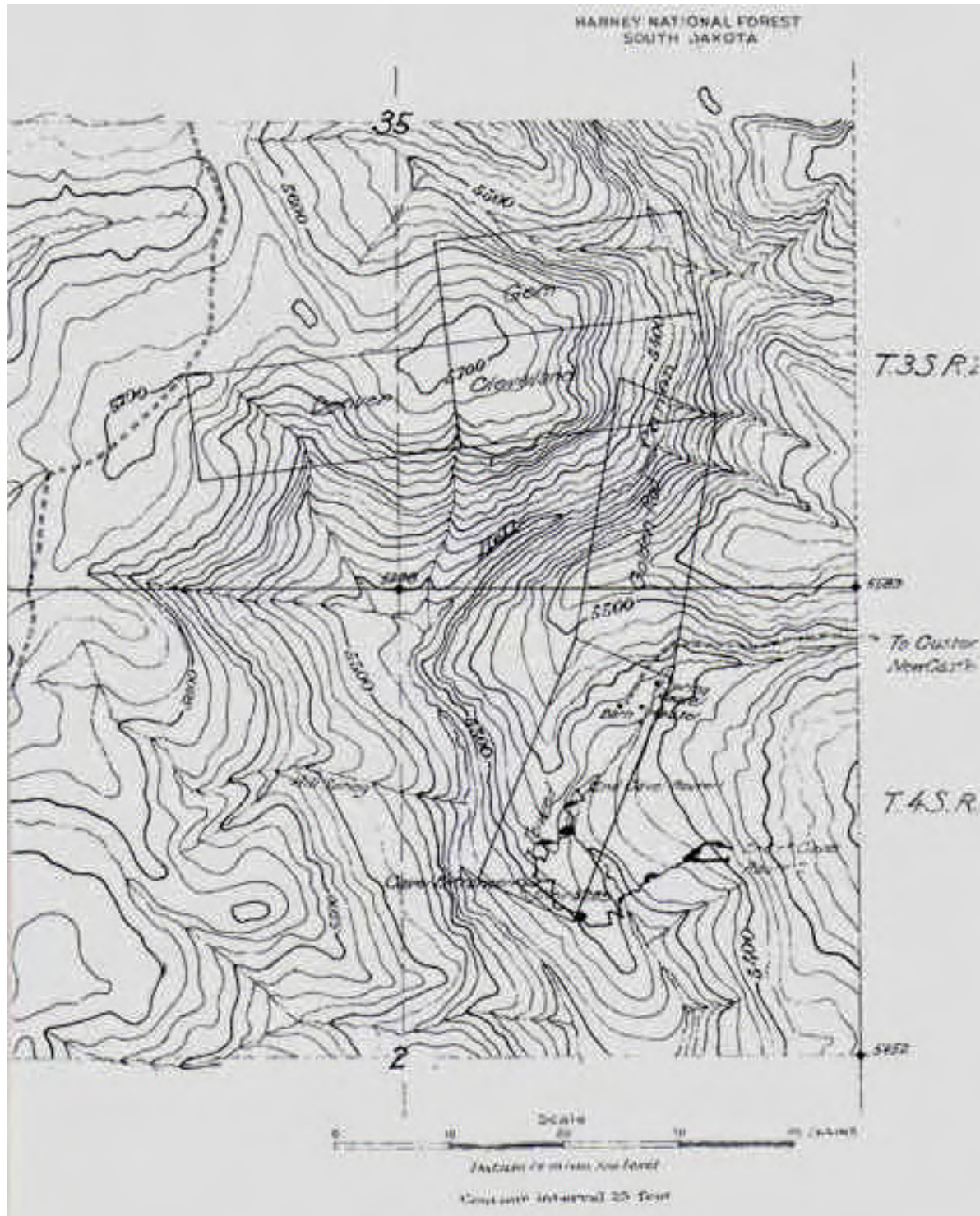


Figure 2.7: Harney National Forest Mineral Claims, 1916 (Source: files at JECA) This map indicates that the Spring house, Hotel, and Barn were present in 1916, as well as the road to Custer, via Lithograph Canyon. It appears that the road terminated at the barn. Two underground cave routes are also illustrated, and the cave entrance, however, no surface route between the hotel and the cave entrance is indicated.



Figure 2.8: 1916 Historic Cave Entrance Overview (Source: JECA 2645)



Figure 2.9: 1916 Cave Entrance Area Overview (Source: JECA 2643)



Figure 2.10: 1916 Historic Cave Entrance Close-Up (Source: JECA 2645)



Figure 2.11: 1916 Cave Entrance Area Close-Up (Source: JECA 2643)

Cultural Landscape Report and Environmental Assessment

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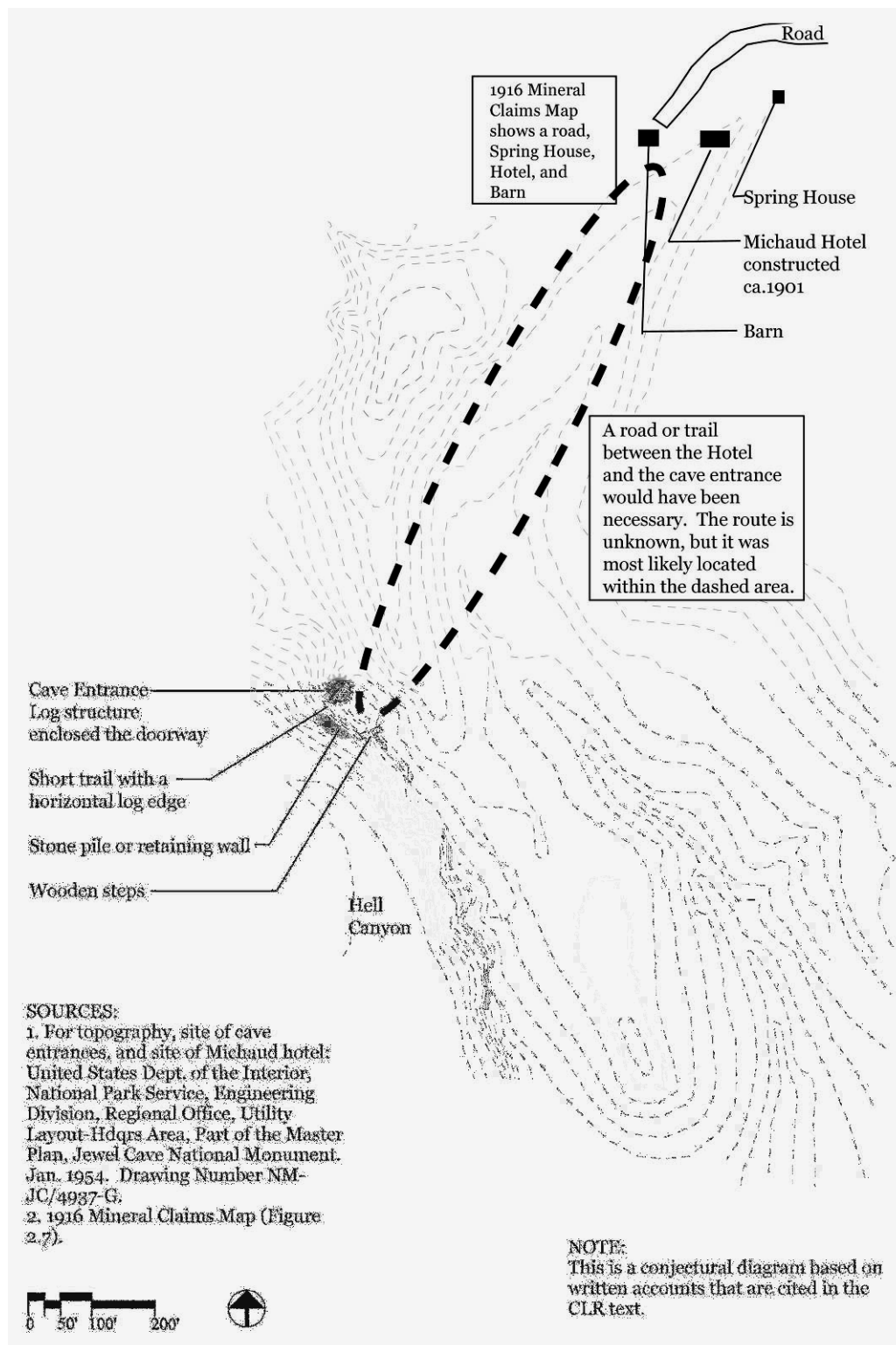


Figure 2.12: Historic Period Plan, 1908-1928

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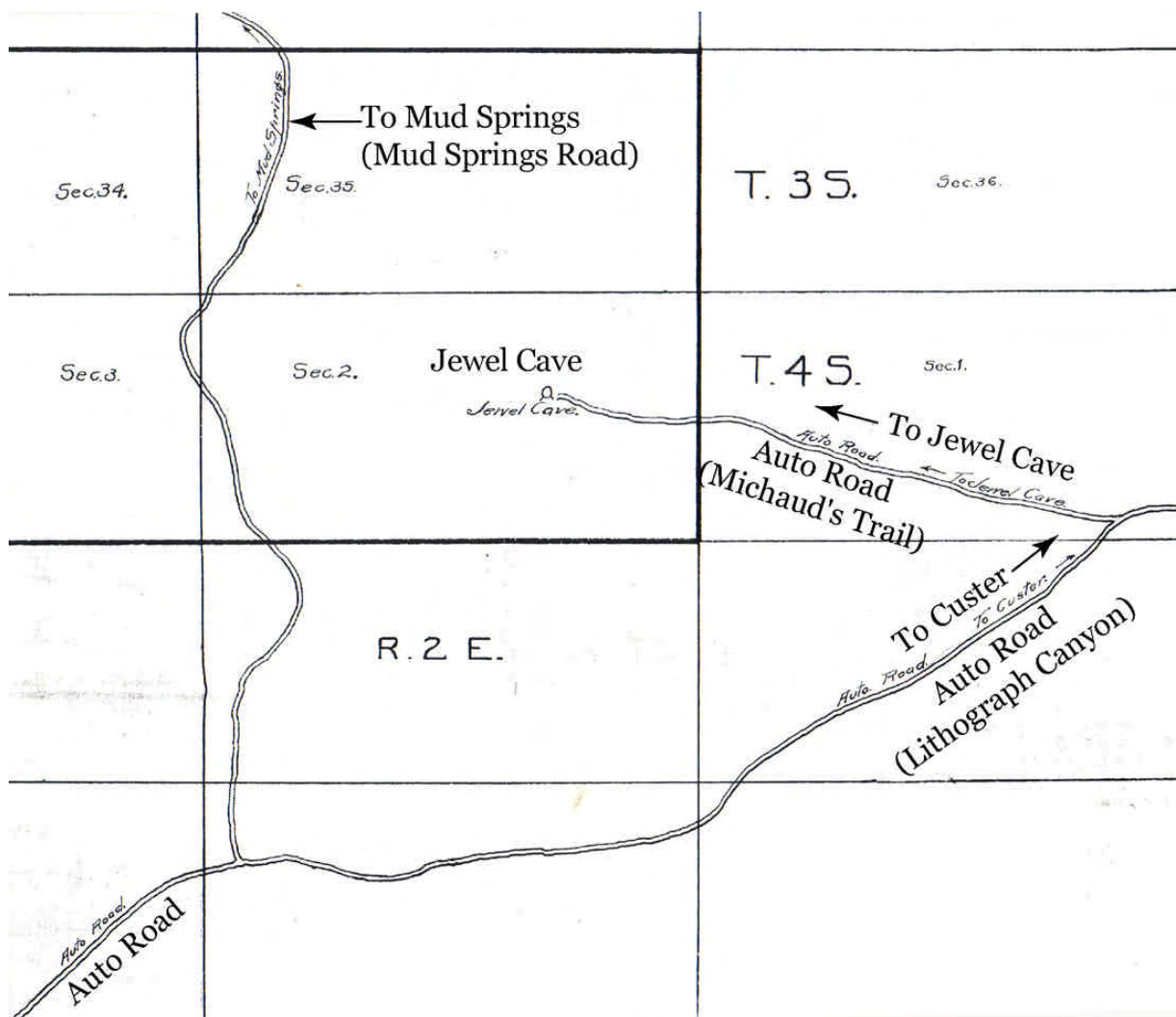


Figure 2.13: Modified from: Historic Road to Jewel Cave, no date, before 1933 (Source: NPS, Jewel Cave Accession Room)

Cultural Landscape Report and Environmental Assessment

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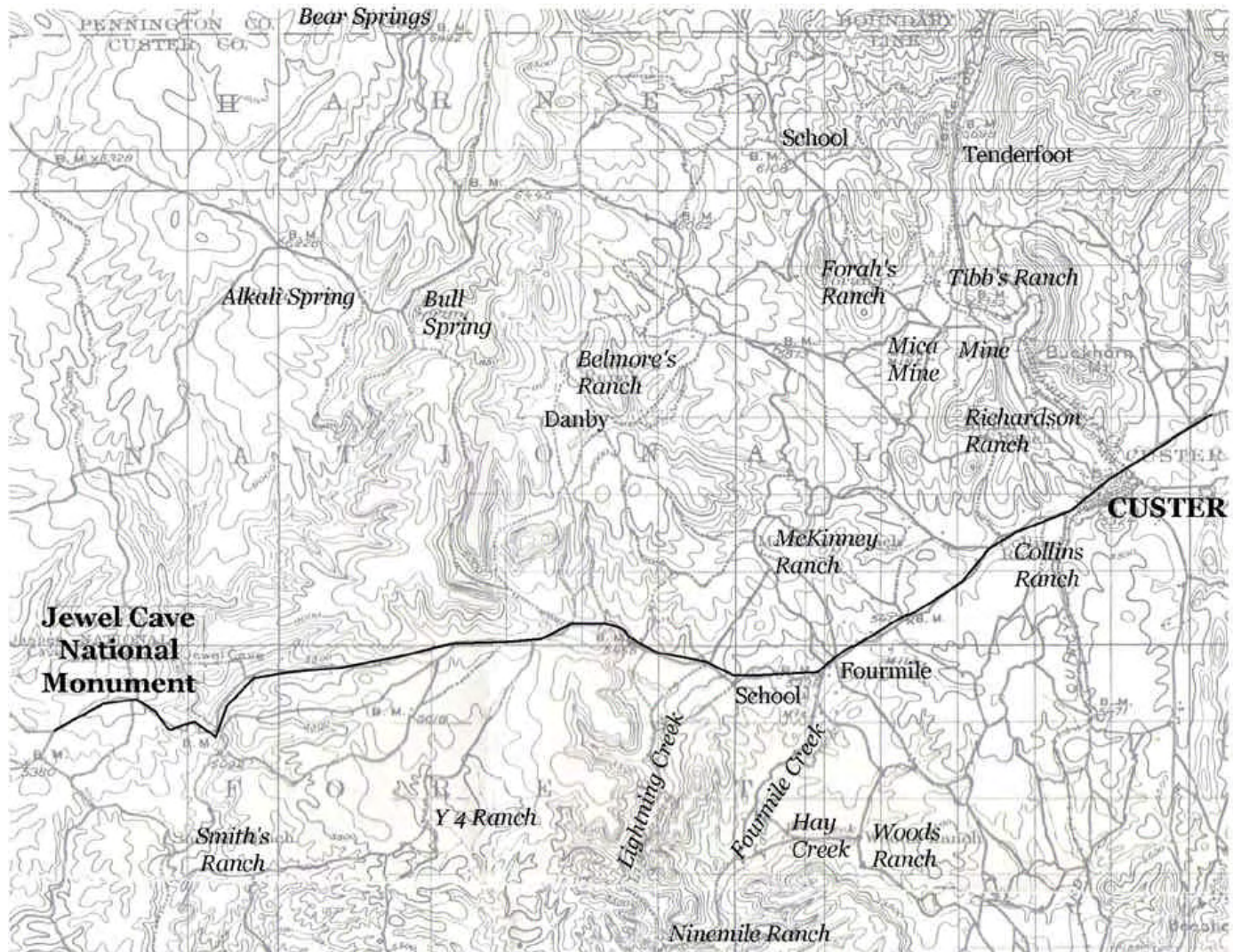


Figure 2.14: Modified from: USGS 1932, ranches and homesteads in the area (Source: USGS South Dakota, Harney Peak Quadrangle, Edition of June 1901, reprinted 1932.)

Note a faint line along what could be the Michaud trail. Also there is a "V" in the road where it crosses Hell Canyon; this indicates that that the original road emerged from Lithograph Canyon and went down Hell Canyon several hundred yards before climbing back up the other side. A later alignment has it emerging from Hell Canyon and immediately crossing it and climbing up a ridge. Part of the reason for this being later, is because it required more cut and fill -- a more difficult engineering feat. The fill, a possible rock wall, is still there.

Cultural Landscape Report and Environmental Assessment

Jewel Cave National Monument

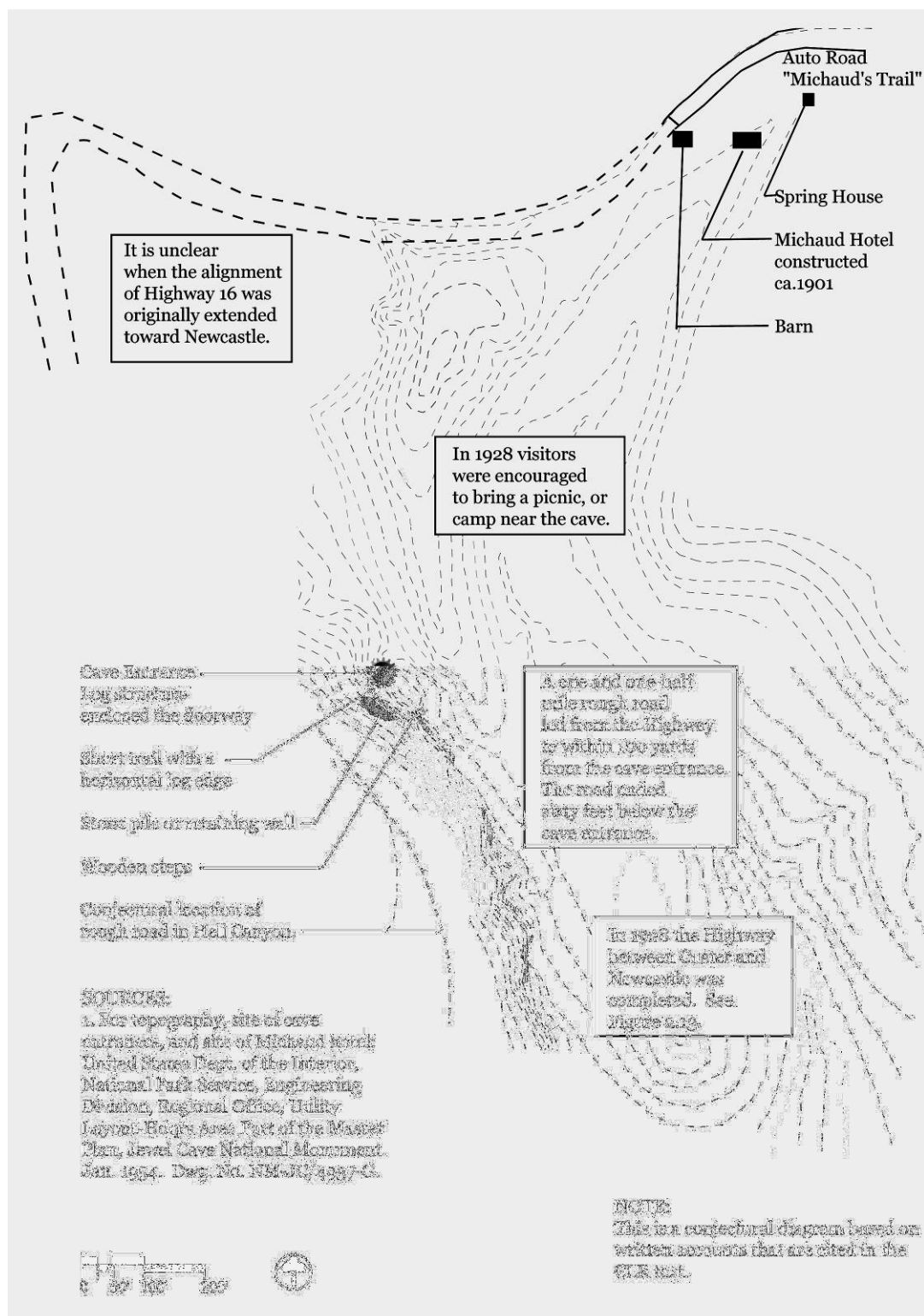


Figure 2.15: Historic Period Plan, 1928-1933



Figure 2.16: Hell Canyon, before Highway construction (JECA 2622)



Figure 2.17: 1933 “landslide across from entrance road” (JECA 2801)



Figure 2.18: Slope graded for new road, 1933 (JECA 2803)



Figure 2.19: Highway 16 Construction, 1937 (Source: JECA 2898)



Figure 2.20: Highway 16 facing east from Hells Canyon, 1937 (Source: JECA 2888)



Figure 2.21: Hell Canyon Road, 1933 (Source, JECA 2896)



Figure 2.22: Completed Highway, 1933 (Source: JECA 2900)



Figure 2.23: CCC Crew Member on Rock before Steps at Hell Canyon, ca. 1935 (Source: accession files at JECA)

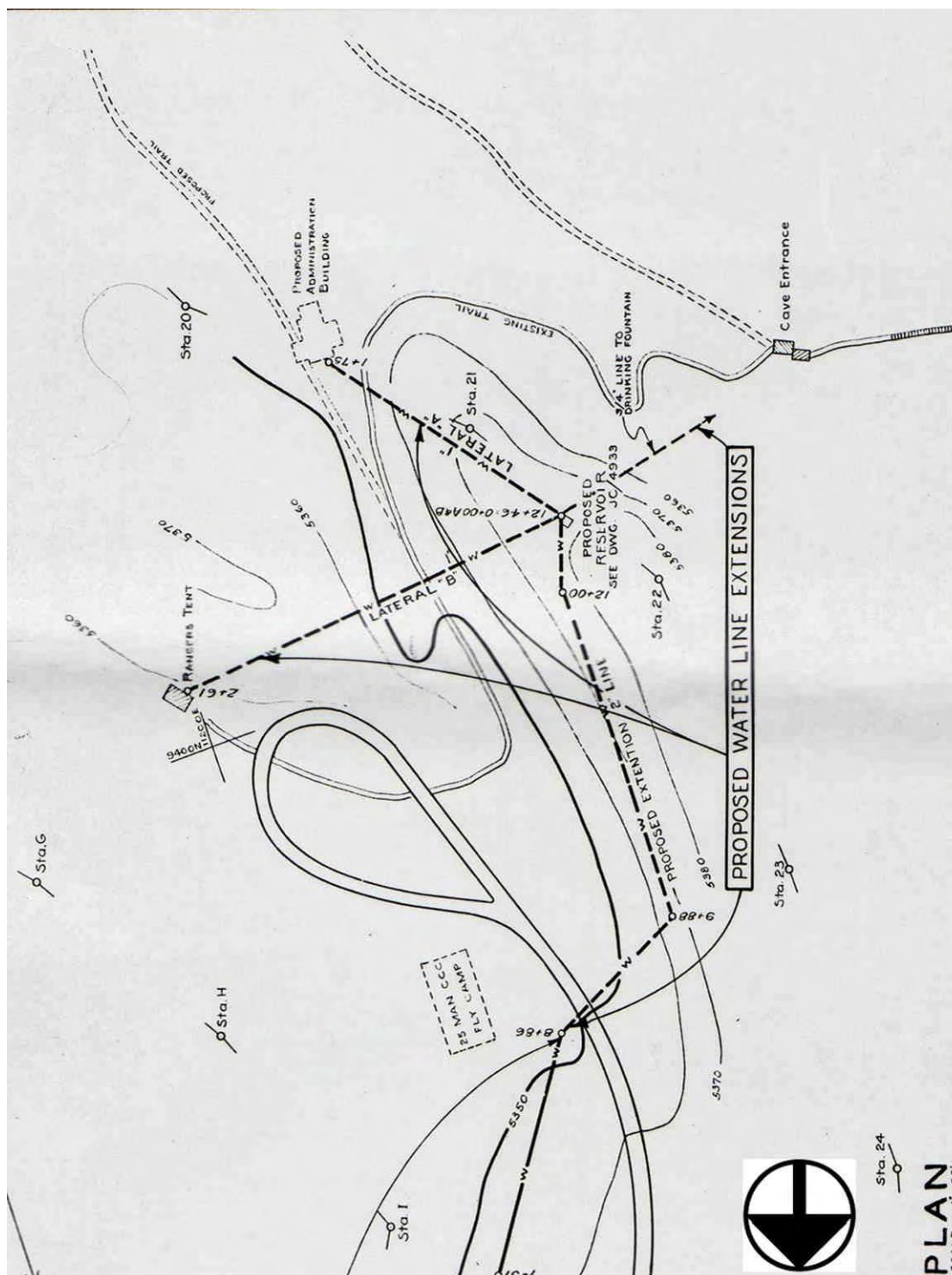


Figure 2.24: Portion of “Jewel Cave National Monument, Proposed Water System, Headquarters Area, August 1935” (approved Sept.1935) (Source: map files at JECA). The two structures shown at the cave entrance are the wooden stairway and the wooden entrance structure.

Cultural Landscape Report and Environmental Assessment

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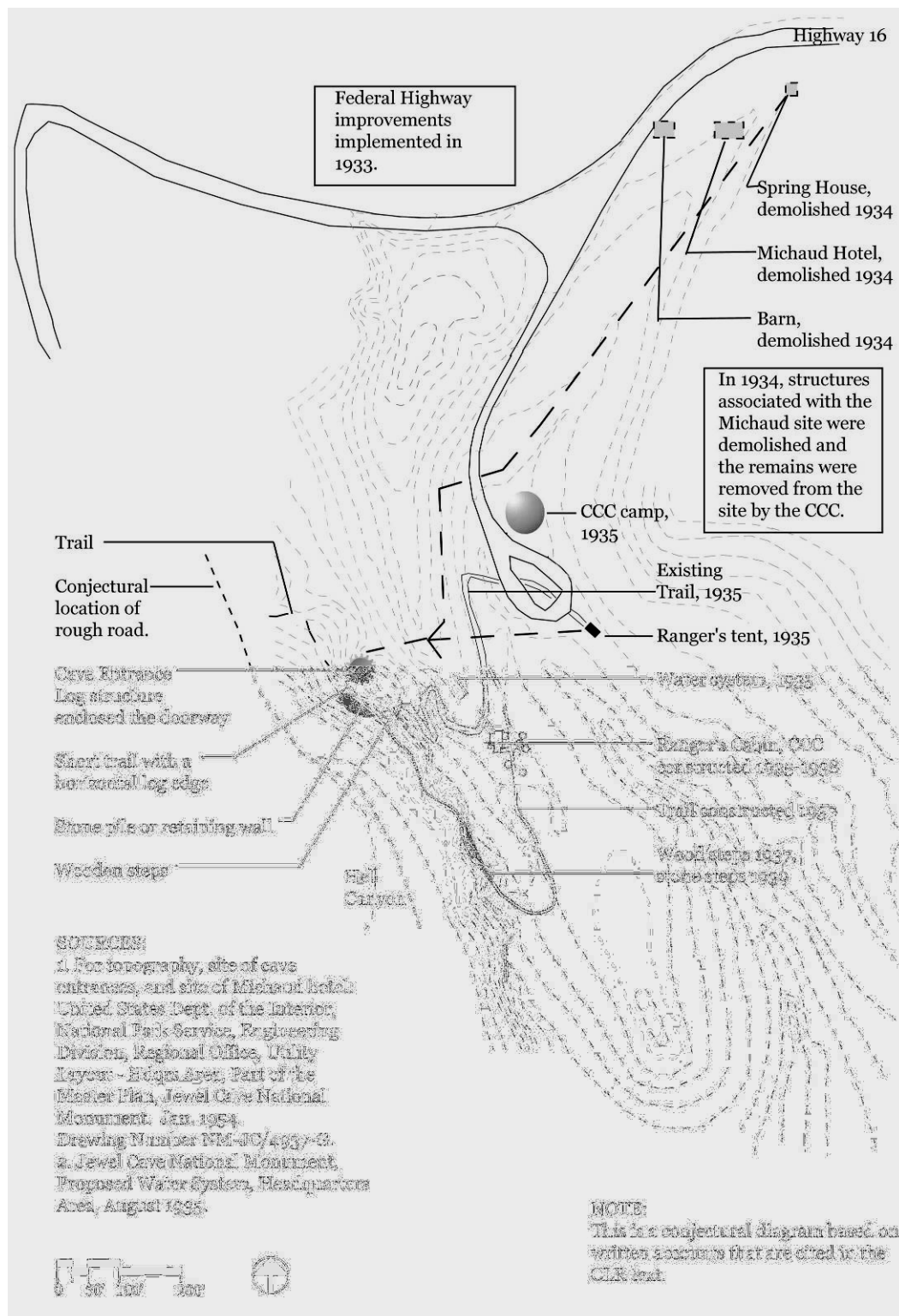


Figure 2.25: Historic Period Plan, 1933-1939



Figure 2.26: CCC Crew, Hell Canyon, ca. 1935 (Source: files at JECA)

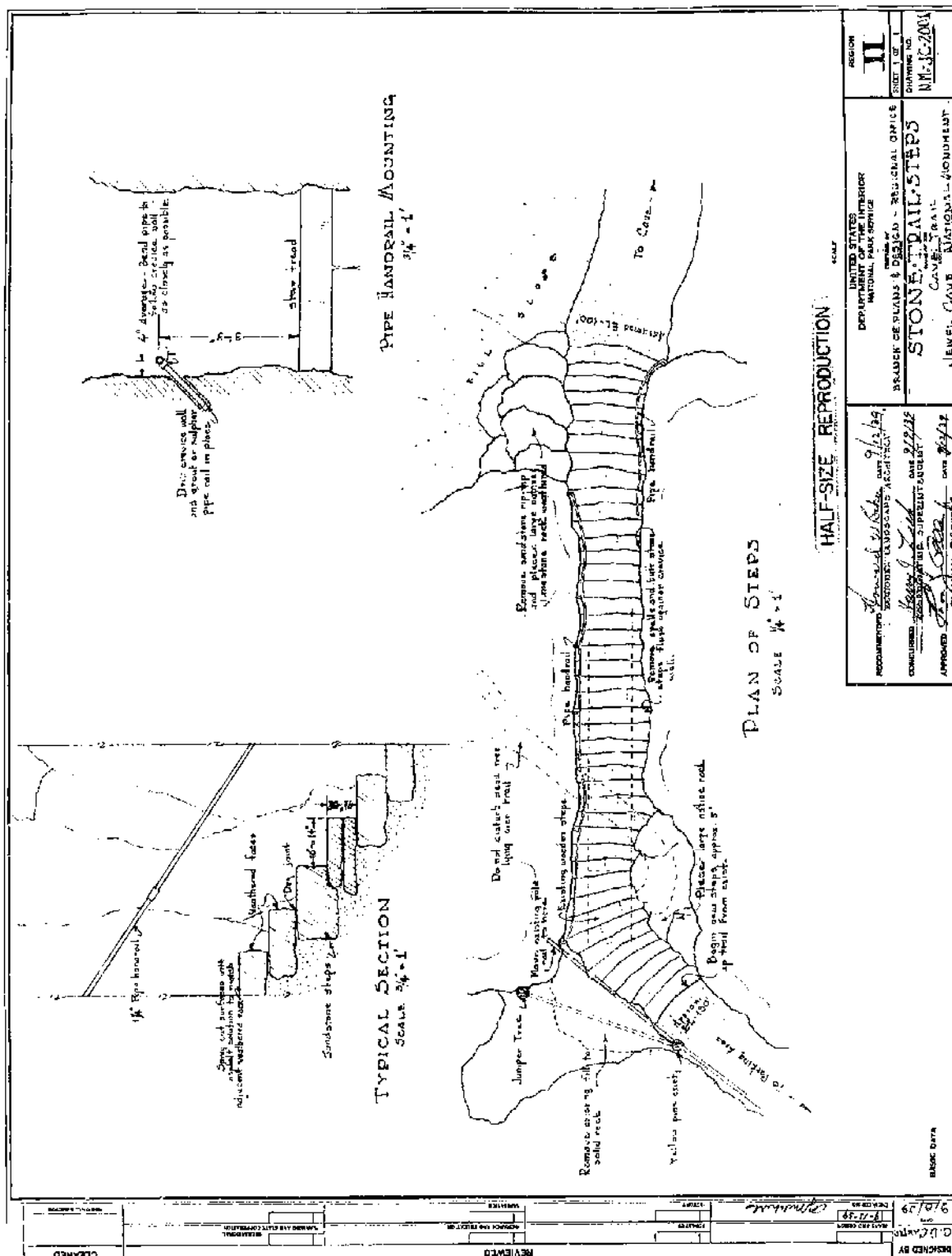


Figure 2.27: Steps Construction Drawing, 1939 (Source: NPS 000479)
Note that in 1939 there were wooden steps in place before the stone steps were constructed.

Figure 2.28: Steps Construction Drawing, 1935 (Source: NPS 000506)



Figure 2.29: Path to Cave Entrance under Construction, ca.1935 (Source: JECA 2794)



Figure 2.30: Path to Cave Entrance, 1938 (Source: JECA 1878)



Figure 2.31: Construction Materials near Cabin, ca.1935 (Source: JECA 2631)



Figure 2.32: Ranger Cabin, 9 August 1938 (Source: JECA 2612 and *Rugged Charm: Ranger Cabin Historic Structure Report, 1999, Figure 8, JECA 2620*).



Figure 2.33: Ranger Cabin, north and east sides, ca. 1935 (Source: JECA 2618)



Figure 2.34: Ranger Cabin, north and west sides, 1935 (Source: JECA 2628 and *Rugged Charm: Ranger Cabin Historic Structure Report*, 1999, Figure 6)



Figure 2.35: 1942 Historic Entrance Sign (Source: files at JECA)

Figure 2.36: Existing Topography 1942 (Source: NPS 000510.TIF)

Figure 2.37: 1942 Master Plan Cover (Source: NPS 000489)

**Figure 2.38: Headquarters Area Plan, part of the Master Plan, 1942
(Source: NPS).**

**Figure 2.39: Excerpt from 1942 Master Plan, Vegetative Type Map
(Source: NPS 000480)**

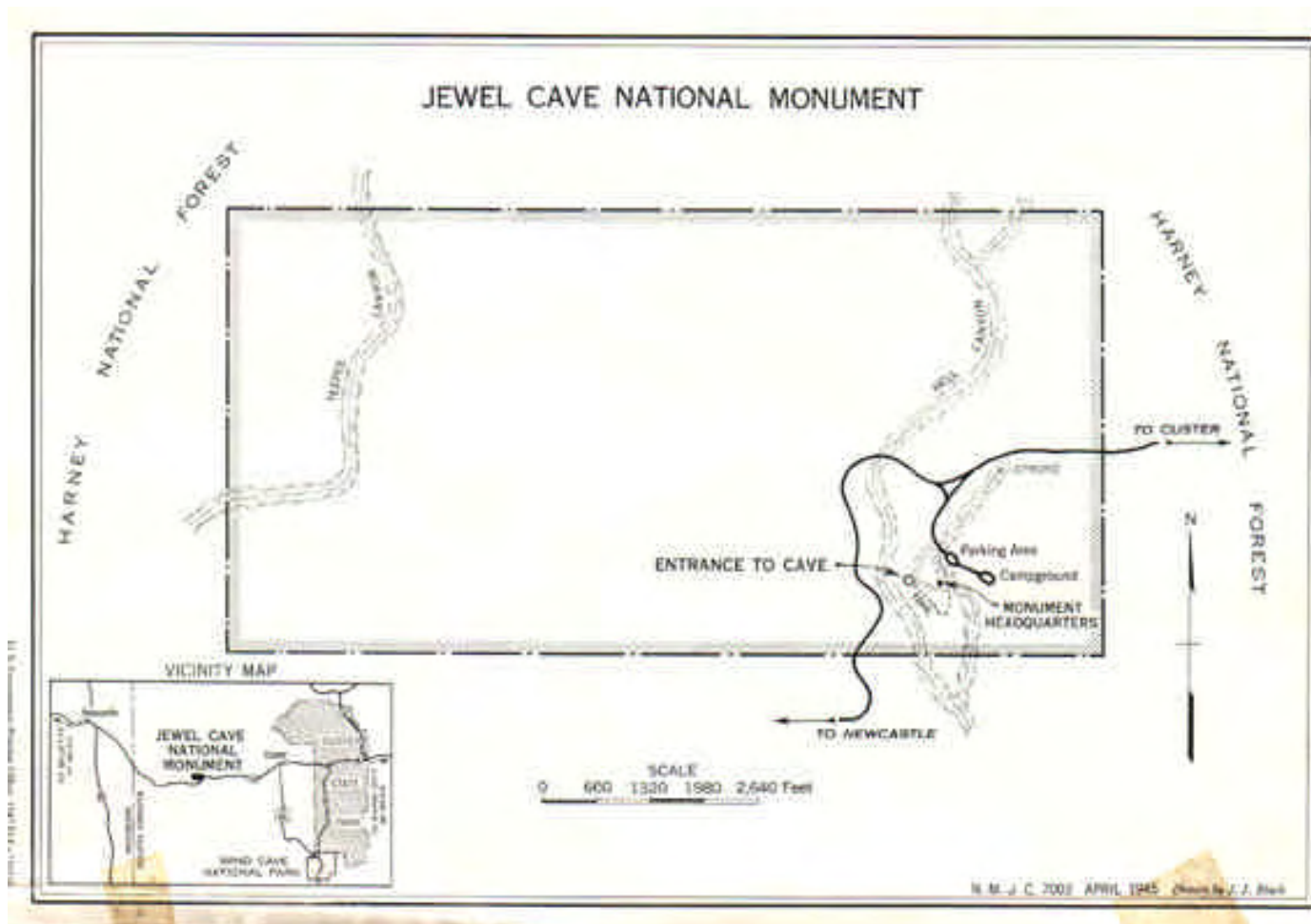


Figure 2.40: Brochure Map 1945 (Source: files at JECA)

Cultural Landscape Report and Environmental Assessment

Jewel Cave National Monument

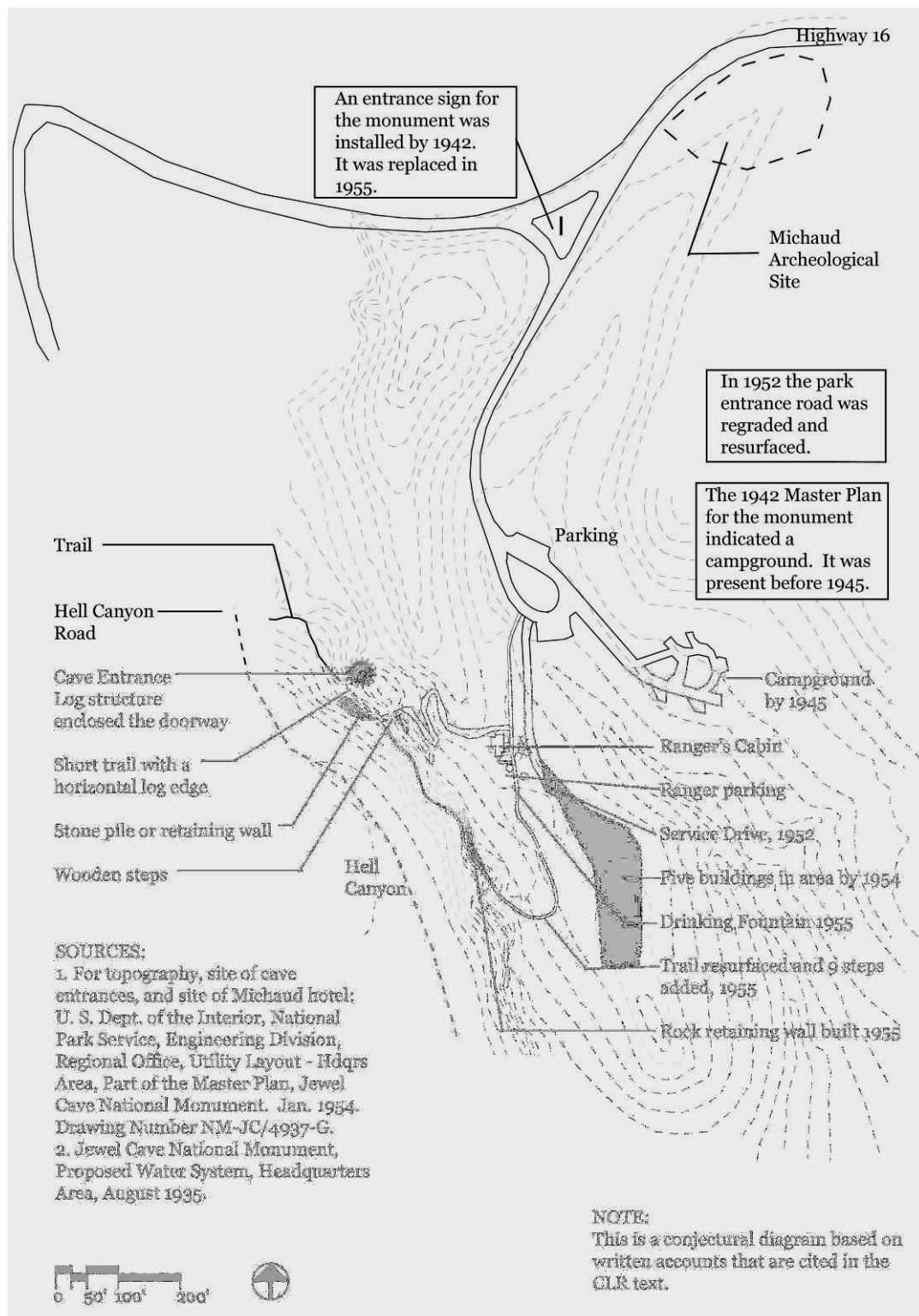


Figure 2.41: Historic Period Plan, 1940-1956

Cultural Landscape Report and Environmental Assessment **Jewel Cave National Monument**

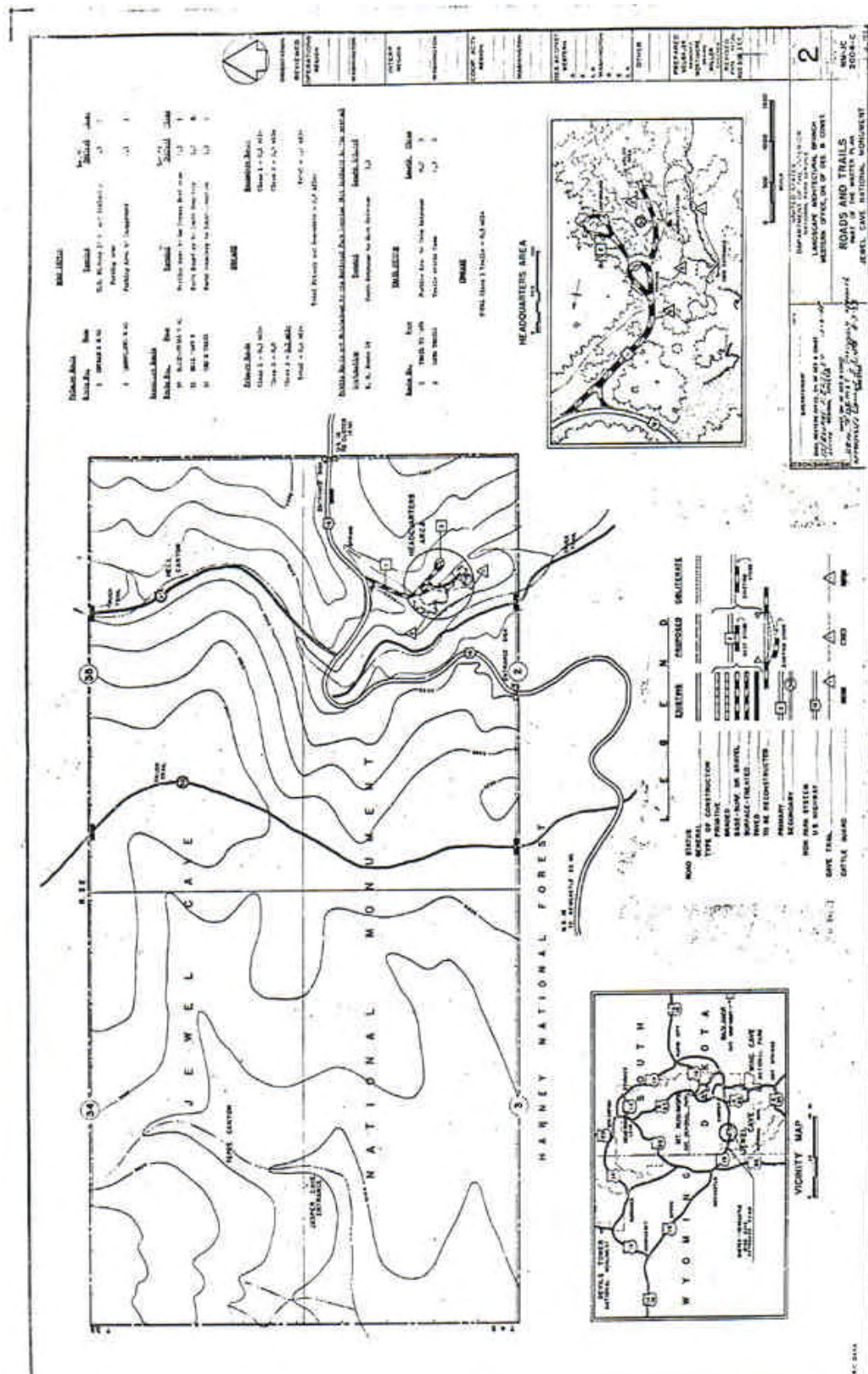


Figure 2.42: Roads and Trails, 1955 (Source: files at JECA)

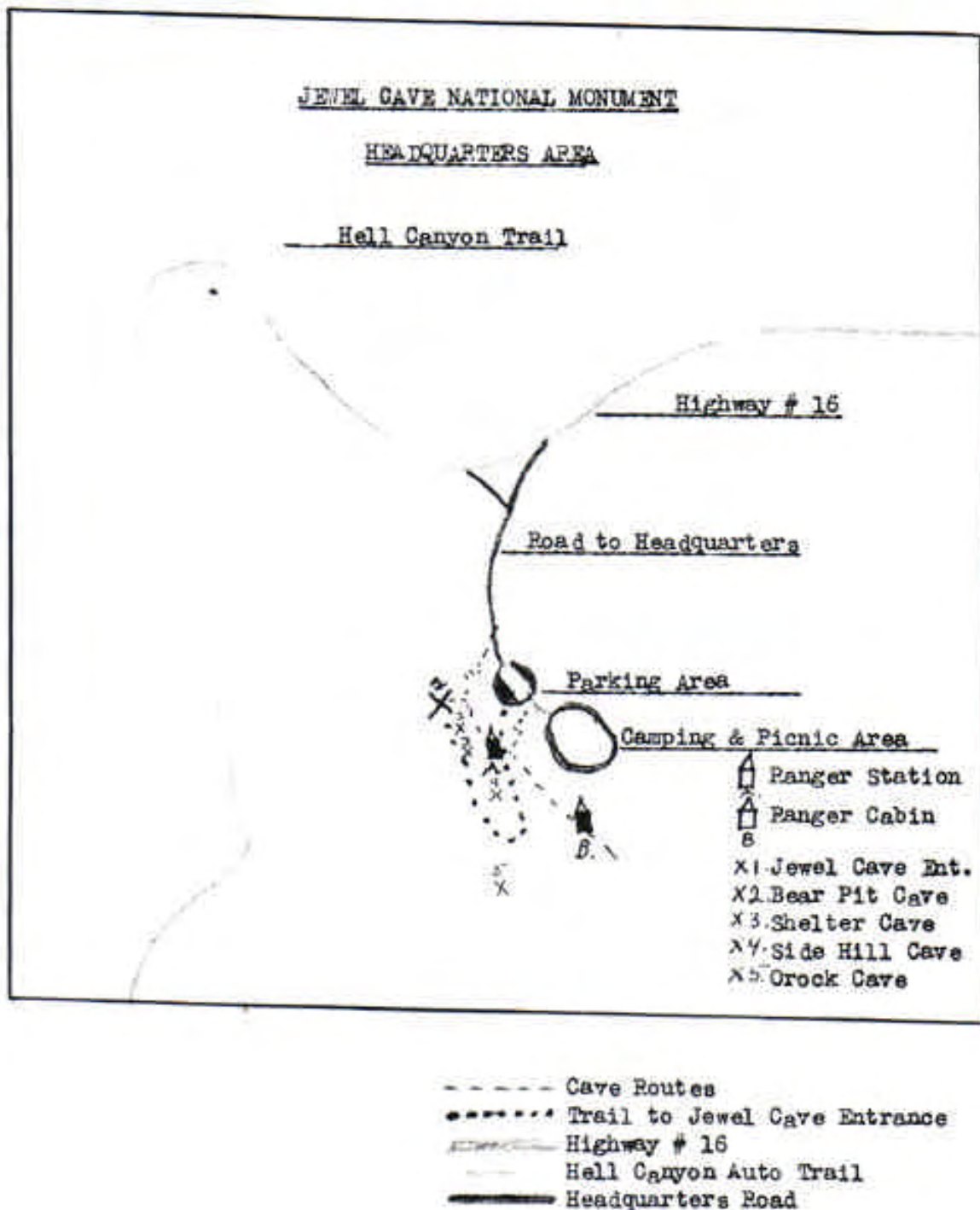


Figure 2.43: Hell Canyon Trail Map, ca. 1946 (Source: files at JECA). The “Ranger Station” shown is the CCC-Ranger Cabin. The building indicated to be the Ranger Cabin is a housing unit located along Service Drive “A.” It appears that at the time the drawing was created the CCC-Ranger Cabin was being used for administrative purposes, while the other building served as a residence.



Figure 2.44: Ranger Cabin Office, summer 1948 (Source: files at JECA)

Figure 2.45: Cave Trails, 1950 (Source: NPS 000488)

Figure 2.46: General Development, 1961 (Source: NPS 000490)

Figure 2.47: Headquarters Area Plan, 1951 (Source: NPS 000492.tif)



Figure 2.48: Aerial View of Historic Area, ca. 1980s (Source: JECA 3009)



Figure 2.49: Aerial View of Historic Area, ca. 1980s (JECA 3008)

Cultural Landscape Report and Environmental Assessment Jewel Cave National Monument

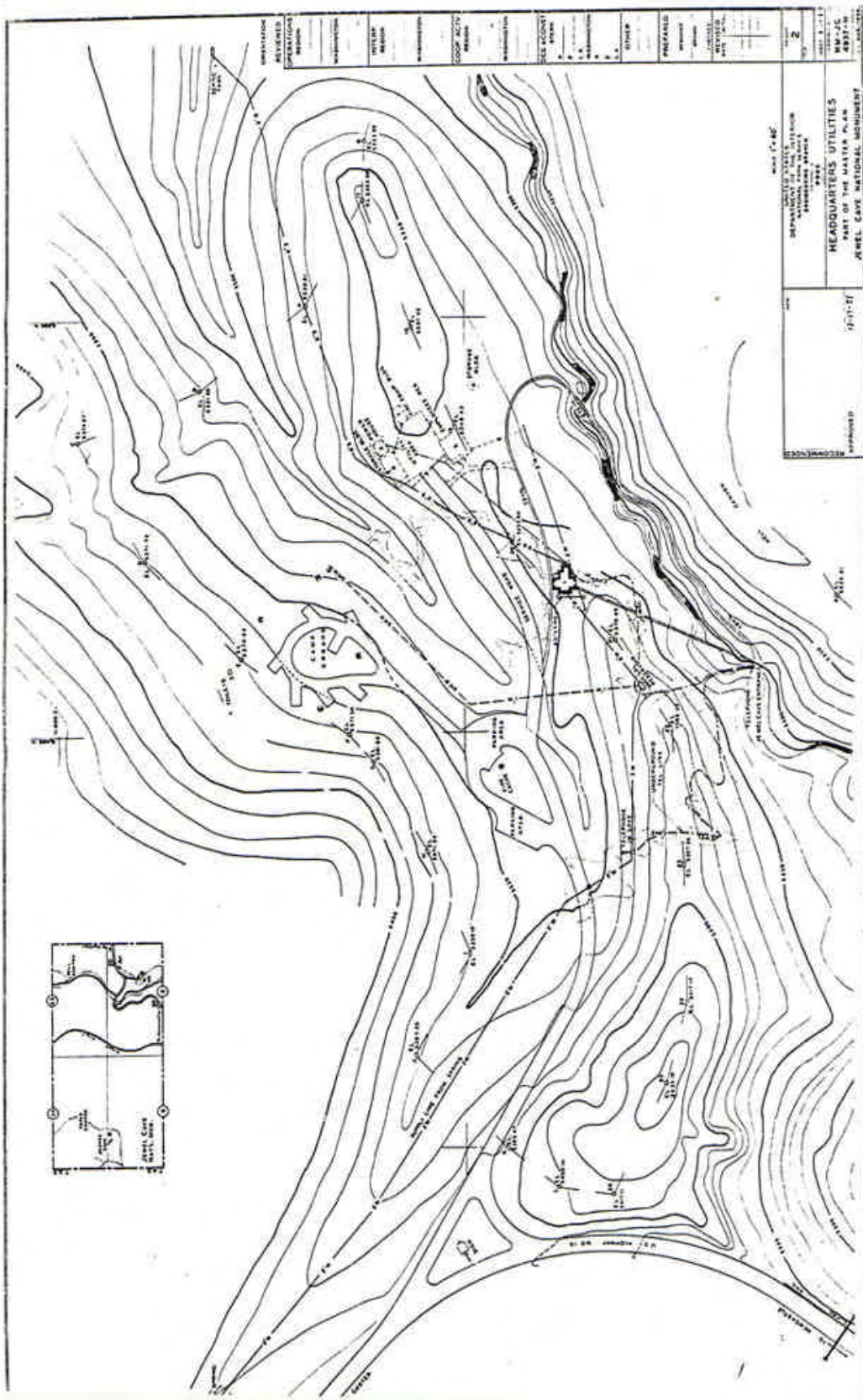


Figure 2.50: Headquarters Utilities Plan, 1961 (Source: files at JECA)

Cultural Landscape Report and Environmental Assessment **Jewel Cave National Monument**

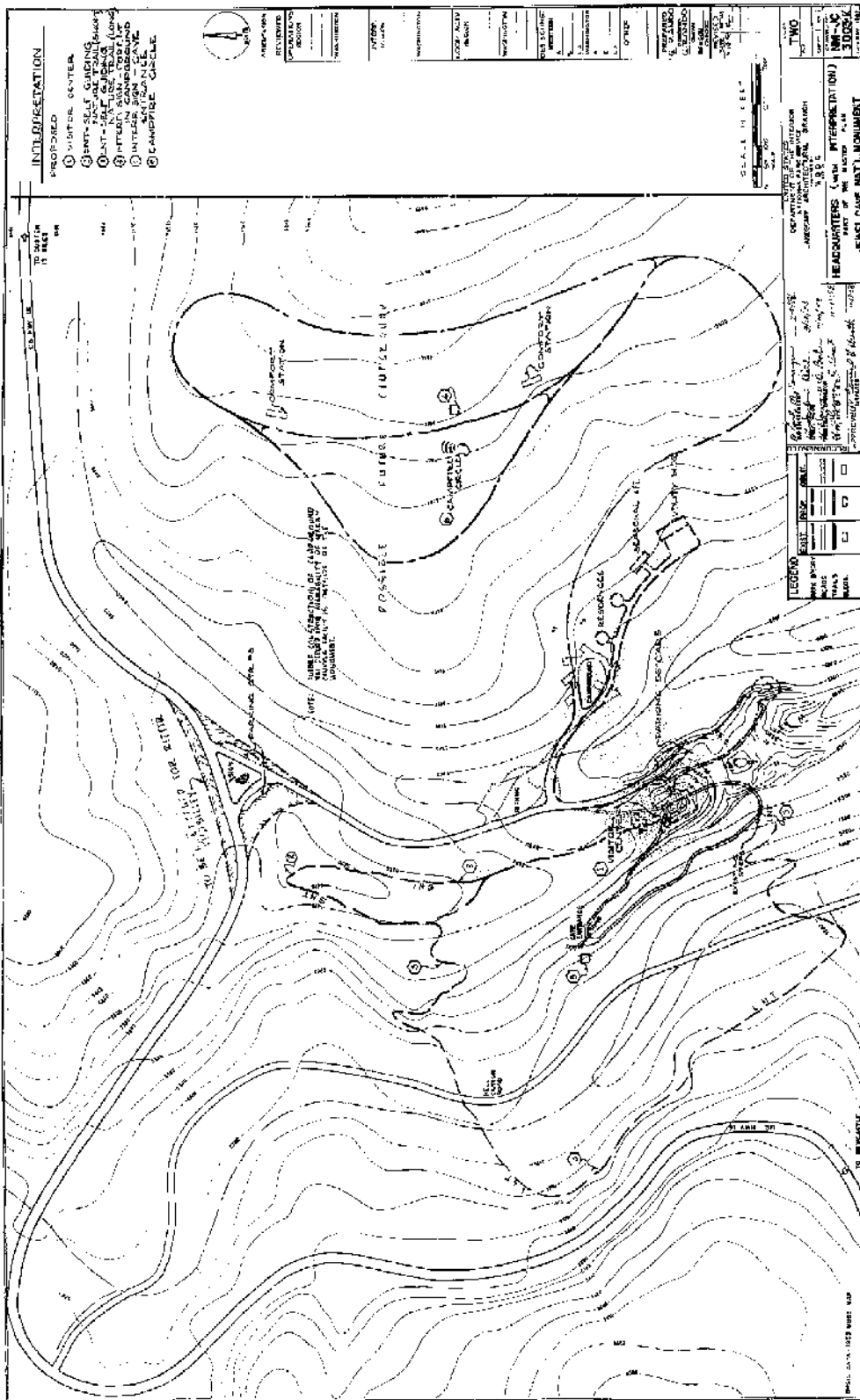


Figure 2.51: Proposed Site Interpretive Plan, 1957 (Source: NPS 000493)

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Jewel Cave National Monument

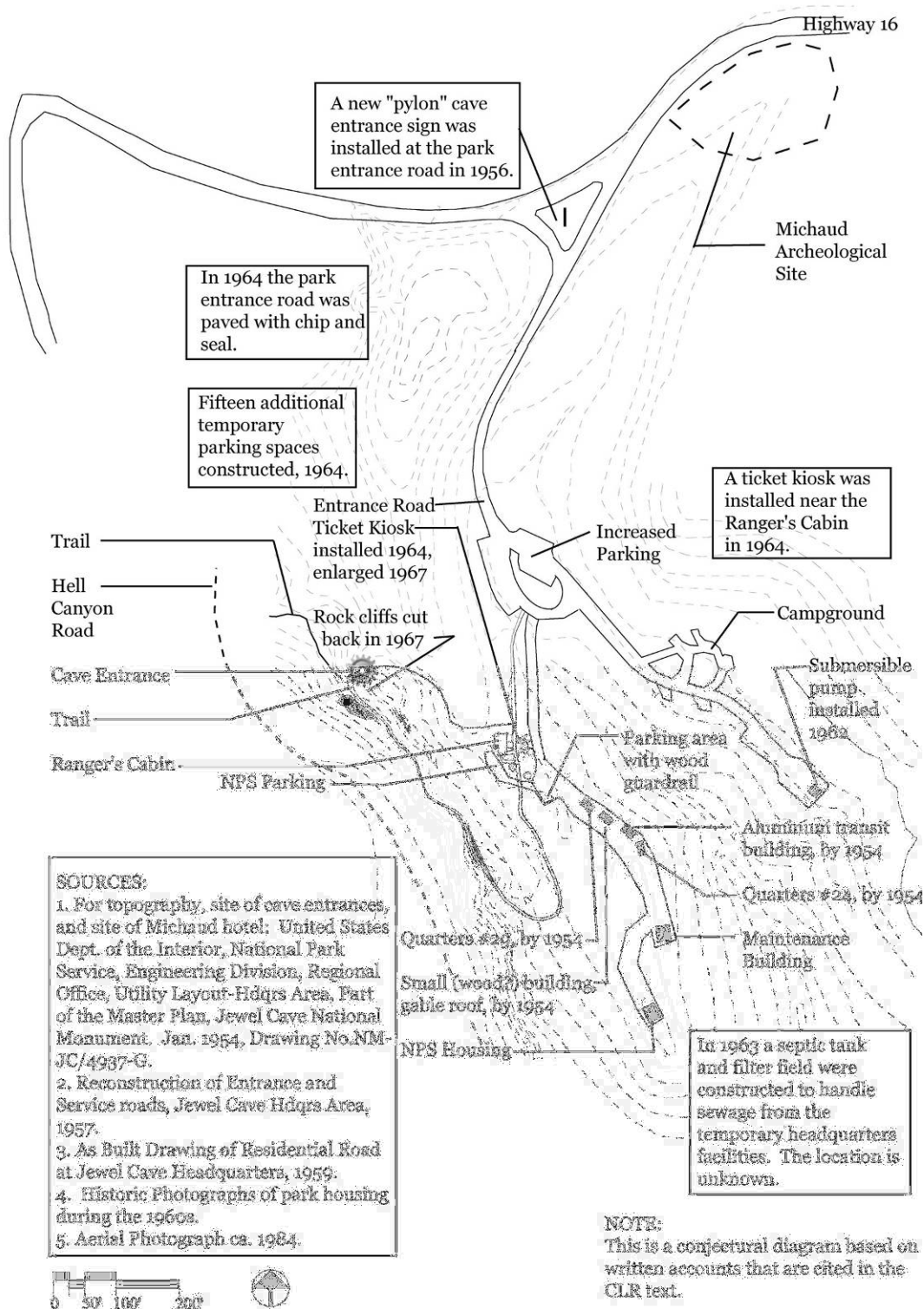


Figure 2.52: Historic Period Plan, 1957-1972



Figure 2.53: Cave Entrance, 1958 (Source: JECA 2633)

Figure 2.54: Headquarters Area As Built, 1959 (Source: NPS 000496.tif)

Figure 2.55: Proposed Site Plan, 1959 (Source: NPS 000495.tif)

Figure 2.56: Preliminary Water System, 1962 (Source: NPS 000497.tif)



Figure 57: Signs to Privies at Historic Area, date unknown (Source: JECA 1994) Note: it is believed that these were near the campground and present beginning in the late 1950s.



Figure 58: Upper Trail to Cave entrance with steps and housing in background, 1961 (Source: JECA 2072)



Figure 59: Ranger Cabin, drinking fountain, sign, and bench, 1961
(Source: JECA 2082)



Figure 60: Trails, benches, parking and housing viewed from roof of Ranger Cabin, 1967. (Source: JECA 1906)



Figure 61: Campground at Jewel Cave, 1961 (Source: JECA 2100)



Figure 62: Ticket Booth, drinking fountain, bench and soda machine at Ranger Cabin, 1967 (Source: JECA 1908)

Cultural Landscape Report and Environmental Assessment

Jewel Cave National Monument

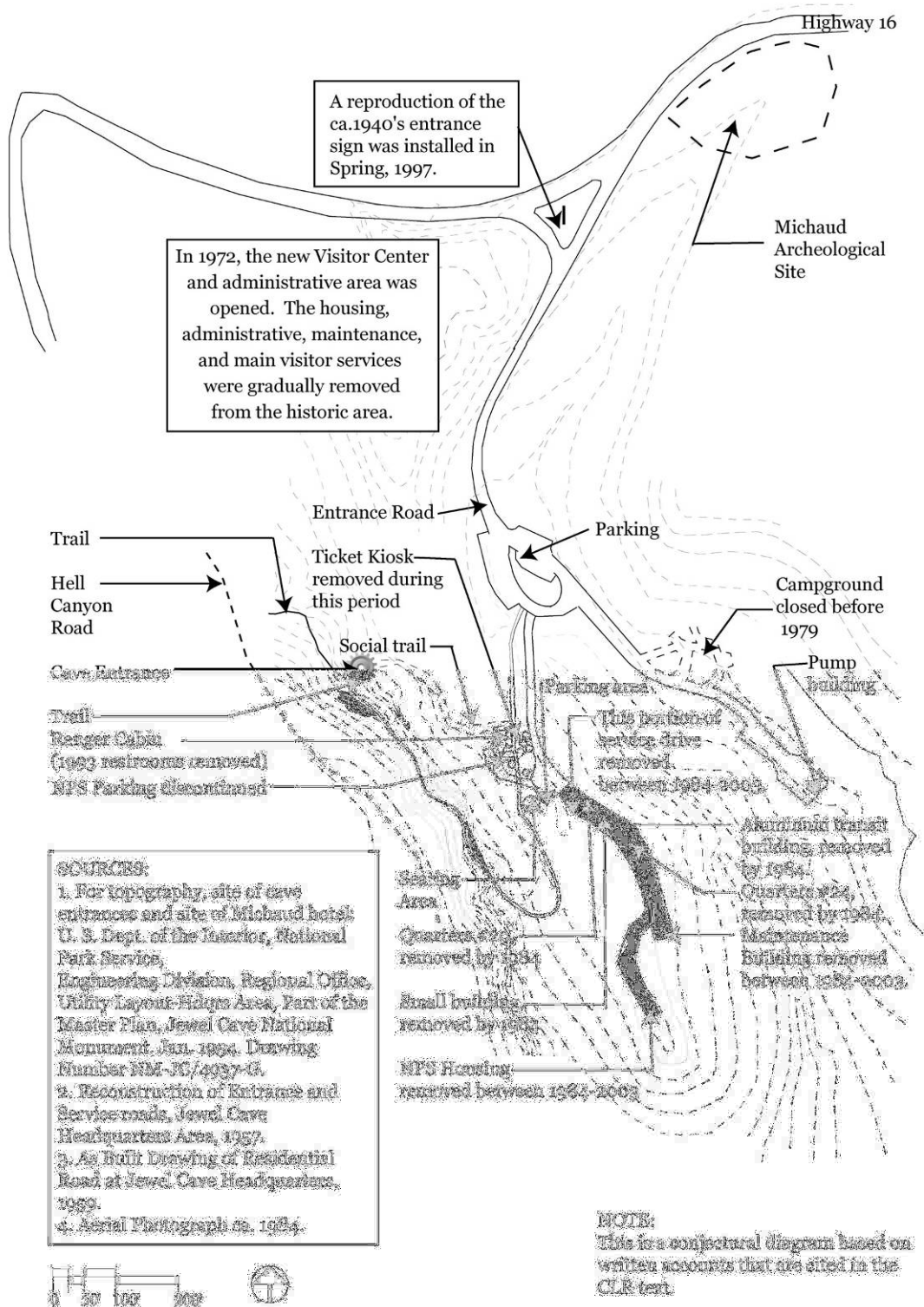


Figure 2.63: Historic Period Plan, 1972-2000

Figure 2.64: Constraint Map, 1981 (Source: NPS 000516.tif)

Figure 2.65: Management Zoning, 1993 (Source: NPS 000514.tif)



Figure 2.66: Aerial of Historic Area, 1984 (Source: JECA 2648C) Note there is still a house located at the end of the driveway that branches from Service Drive “B,” and a maintenance building at the end of Service Drive “B.”

Chapter III:
Existing Conditions
(Affected Environment)

CHAPTER III: EXISTING CONDITIONS (Affected Environment)

This chapter describes existing conditions and the impact topics that could be affected by the treatment alternatives. This chapter provides the foundation for the analysis of potential impacts, which is presented in Chapter VII.

Cultural Landscape Methodology

A site survey was conducted in June 2003 to record the existing conditions of the structures, vegetation, and cultural landscape features at the historic area.

Existing Conditions Plans are illustrated in Figures 3.1 and 3.2. An assessment of cultural landscape characteristics relevant to the historic area is provided including land use, spatial organization, topography, vegetation, circulation, structures, small-scale features, and archeological sites.

Descriptions of existing features of the cultural landscape and their conditions are provided in Table 1. Conditions evaluations are made based on the following criteria:¹

- **GOOD** - The features of the landscape need no intervention; only minor or routine maintenance is needed.
- **FAIR** - Some deterioration, decline, or damage is noticeable; the feature may require immediate intervention; if intervention is deferred, the feature will require extensive attention in 3-5 years.
- **POOR** - Deterioration, decline, or damage is serious; the feature is seriously deteriorated or damaged, or presents a hazardous condition; due to the level of deterioration, damage, or danger the feature requires extensive and immediate attention.

¹ Page, Robert R. *Cultural Landscapes Inventory Professional Procedures Guide*. U. S. Department of the Interior, National Park Service, Cultural Resources, Park Historic Structures and Cultural Landscapes Program, Washington, DC, 1998, 62.

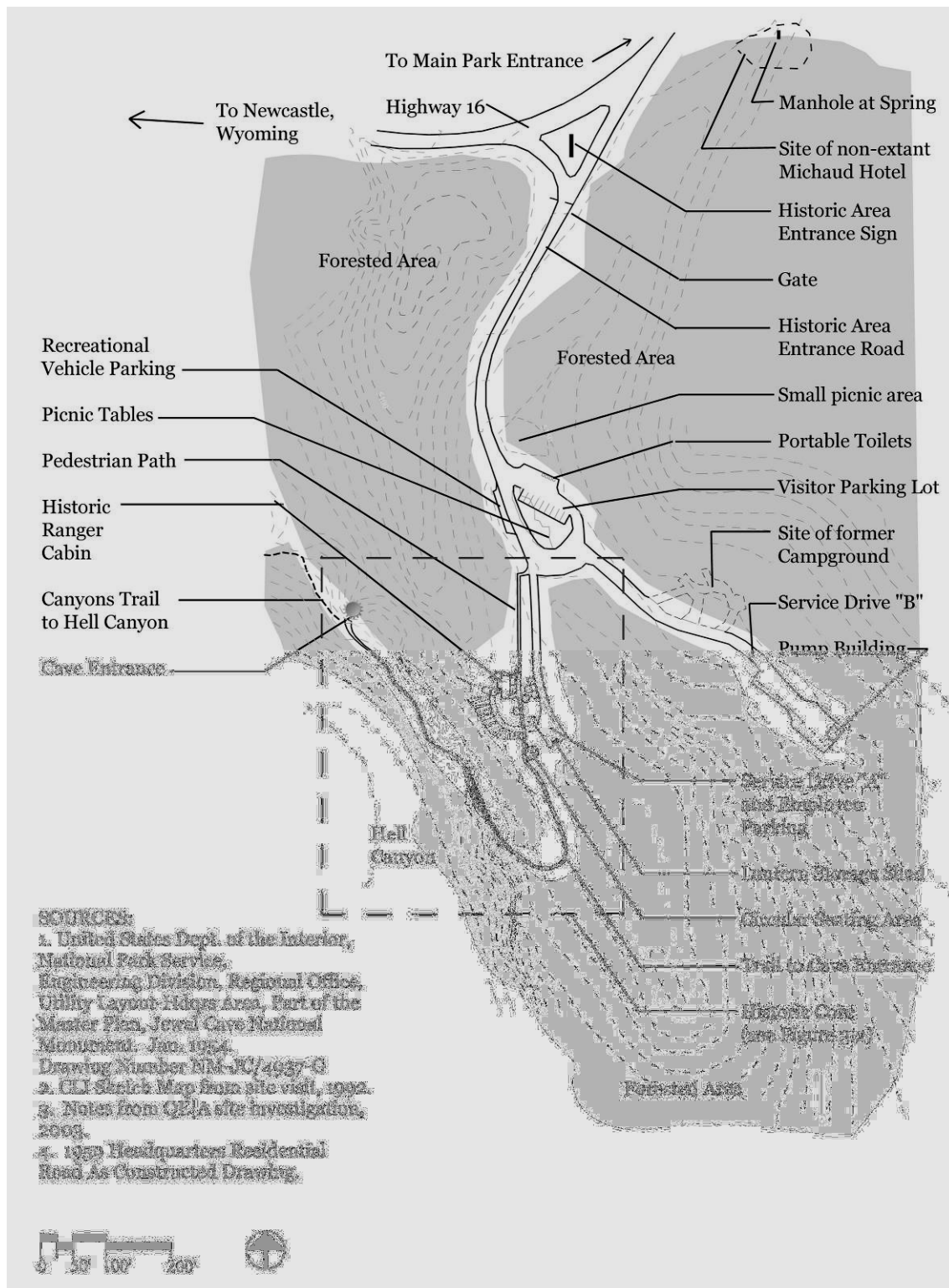


Figure 3.1: Historic Area Existing Conditions, 2003 (Prepared by QE|A)

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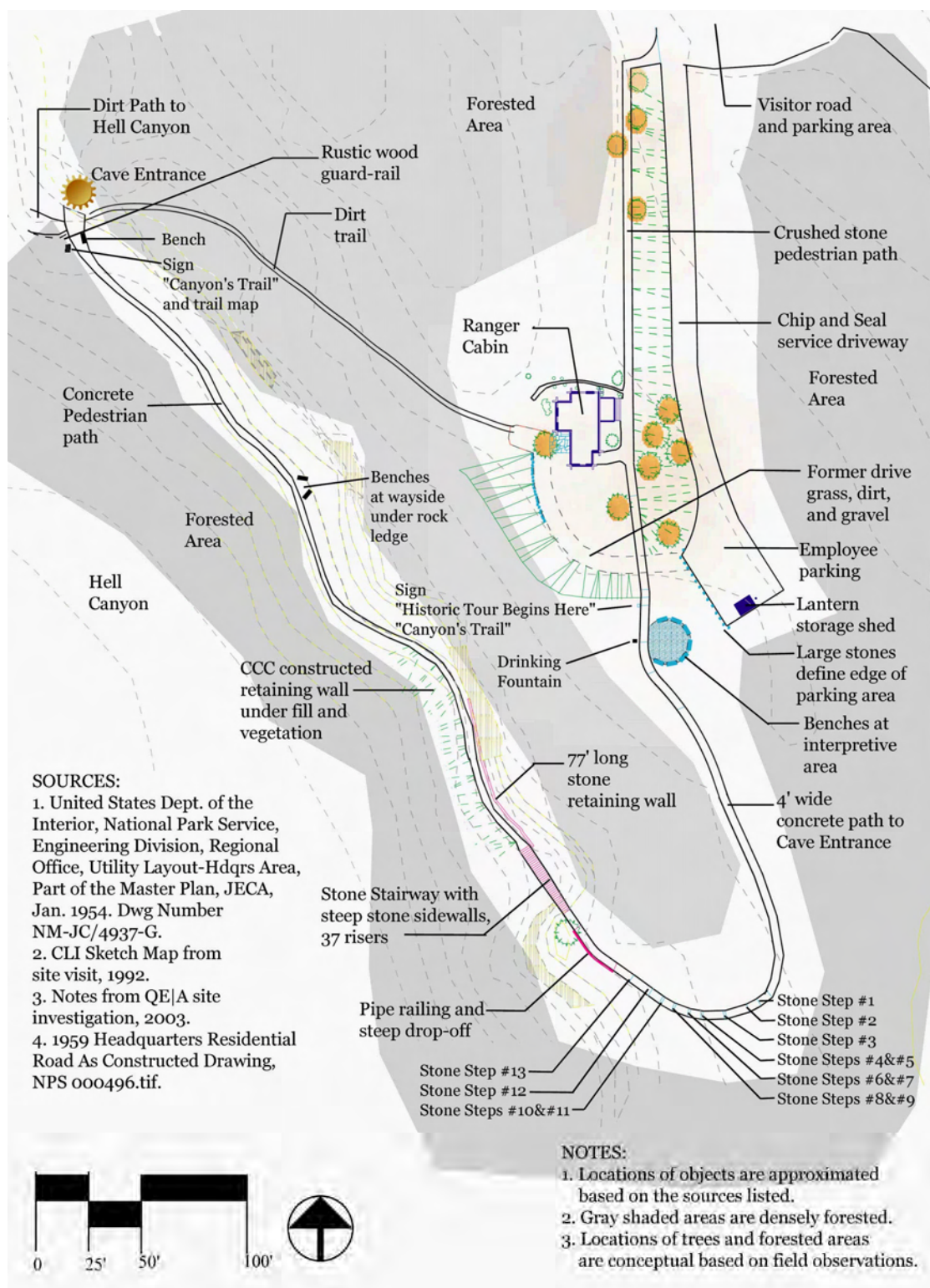


Figure 3.2: Historic Core Existing Conditions, 2003 (Prepared by QE|A)

Environmental Setting

Jewel Cave is located on the southwestern edge of the Limestone Plateau area of the Black Hills physiographic region. The area is characterized by steep topography and deep canyons underlain by resistant Pahasapa limestone (Mississippian). Elevations throughout the Monument range from 5,100 feet above sea level at the southern part of Hell Canyon to 5,860 feet above sea level at the far northeastern corner of the Monument. Ponderosa pine forest dominates the landscape. The historic area is the only portion of the Monument that has not been logged.²

Seasonal temperatures vary greatly, with an average winter temperature of 23 degrees Fahrenheit and summer average temperature of 62 degrees Fahrenheit. The average daily minimum temperature in Custer is 9 degrees in winter and average daily maximum in summer of 80 degrees. The area is dry with an average annual precipitation of 18 inches, the majority of which typically falls between April and September. The area is prone to thunderstorms and hail. Average seasonal snowfall is 45 inches.³

Cultural Resources (All elements of the cultural landscape)

Land Use

The historic area lies completely within the boundaries of Jewel Cave National Monument, and is managed as an interpreted historic site. Adjacent properties are managed as natural resource preservation areas as units of Jewel Cave National Monument and the Black Hills National Forest. The historic area serves as a visitor contact site. Ranger-led interpretive tours originate at a circular seating area located

² Marriott, Hollis and Ronald L. Hartment. *A Survey of the Vegetation of Jewel Cave National Monument*. Unpublished Report. University of Wyoming Department of Botany, 1986.

near the historic Ranger Cabin. The seating area also serves as a waiting area for visitors with tour tickets. The tours utilize the historic trail and stone steps to approach the historic entrance to the cave.

The historic area includes visitor parking for approximately ten vehicles and a rustic picnic area. There are portable toilets and a drinking fountain. Although the gate at Highway 16 is locked at the end of each day, the area remains accessible to hikers via the Canyons Trail. Two service roads provide vehicular access and parking for NPS staff and maintenance vehicles.

Geology, Soils, Topography and Spatial Organization

The historic area is located entirely on the cave-bearing Pahasapa limestone, and the lowest two subunits (sandstone and limestone) of the Minnelusa Formation. All three units are very permeable, providing a mechanism for surface disturbances to impact cave resources via infiltrating water.

The topography ranges from moderate to steep slopes. The rock units dip gently to the south and are incised by nearby Hell Canyon – about 100 feet deep with vertical cliffs up to 30 feet high. The entrance to the cave is located at the base of a cliff on the east wall of the canyon, about 70 feet above the canyon floor. Soils are generally thin, especially on south-facing limestone surfaces. All soils are well-drained.

The overall spatial organization of the historic area responds to the steep indigenous topography. The roads and trails stretch along the contours to achieve gradual changes in elevation in an area made up of steep slopes surrounding relatively

³ Soil Survey of Custer and Pennington Counties, Black Hills Parts, South Dakota.

flat ridges and valleys. The result is a system of linear corridors and nodes that respond directly to the native terrain and the utilitarian needs of the site visitors. Figure 3.3 illustrates the system of corridors and nodes, as they relate to the steep slopes indigenous to the site.

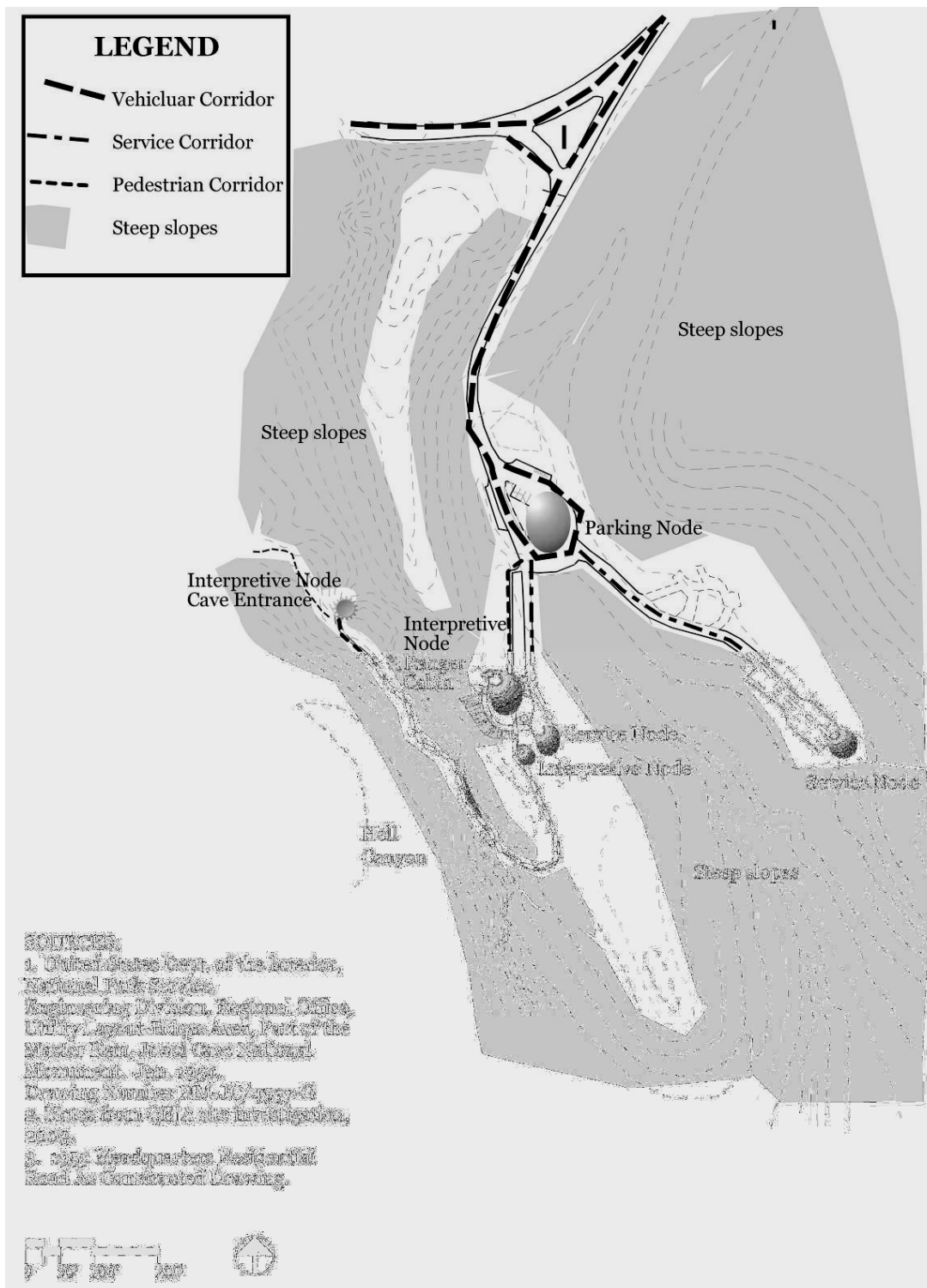


Figure 3.3: Spatial Organization and Topography (Prepared by QE|A)

Vegetation

According to a 1986 vegetation survey at the park, the historic area lies within a large ponderosa pine-snowberry association and Hell Canyon is composed of the ponderosa pine-gooseberry association. Generally, ponderosa pine trees in the southern Black Hills tend to be small in diameter for their age. This is because of the semi-arid environment, with an average of only 17 inches of rain each year. While the ponderosa pine-snowberry association makes up a large portion of the Monument, the historic area stand differs from corresponding stands in other areas within the park. The average tree size in the historic area is larger than those in adjoining areas, sapling density is higher, and this is the only forest stand in the park that does not include cut stumps. Many of the trees in the historic area are older than those in nearby stands and it is likely that the historic area was not logged. It is believed that there are trees within the historic area that are at least 260 years old, and possibly trees that are closer to 600 years old.⁴

The ponderosa pine-snowberry association occurs on west-and east-facing slopes and gentle south-facing slopes. It also occurs on or near level upland topography such as ridgetops and benches, and integrates with the ponderosa pine-little bluestem association. The individual trees are large and stands range from closed to somewhat open. Stands of dog-haired pine are common and Snowberry

⁴ Mike Wiles, Jewel Cave National Monument Cave Specialist, stated in an email dated 22 July 2004 that in 1992 Marsha Davis determined the ages of trees growing in the dry stream channel in Hell Canyon. On average these are younger than those outside the stream channel. The oldest tree was 261 years, with a diameter of 28.7 inches. Trees only 8 inches diameter were often at least 100 years old. In reference to land north of US Highway 16 near the Monument, Amanda McAdams of The Nature Conservancy stated in a 2 June 1997 memo to the park that “much of this old-growth stand consists of areas which have never been logged.” Although the source of her statement is unknown, the historic area has definitely not been logged since 1908 when the Monument was established. No evidence has been found to indicate the area was logged before 1908.

(*Symphoricarpos sp.*) is the dominant understory species. In 1986, the density of herbaceous groundcover varied from 0% to 100% from site to site, and grassy openings were common.⁵ Forty-eight exotic species were known to exist at JEWEL CAVE, three of which were considered noxious weeds in Custer County (*Euphorbia esula*, *Cirsium arvense*, and *Convolvulus arvensis*).⁶ Since the survey was conducted in 1986, vegetative communities have been altered by a devastating forest fire. In the year 2000 the Jasper Fire burned through the entire Monument. Despite the fast progression of the wildfire, the intense heat inflicted damage to the native forest vegetation. As of June 2003, the encroachment of noxious weeds in the ground layer was extensive. Areas that previously included little or no invasive species are now dominated at the ground layer by Prickly lettuce and Canada thistle. Although the fire did not eliminate the native seed bank, it is possible that the weed seed coexisted with the native seed, survived the fire, and then out-competed the native plants during growth subsequent to the fire. The intensive heat and crowning of the fire also wreaked havoc on the ponderosa pines. The park displays extensive areas of dead ponderosa pine, and three years after the fire there is little or no evidence of pine seedlings in some areas. The vegetation at the historic area was affected by the fire and numerous maturing ponderosa pines were lost.

⁵ Bock, Jane H. and Carl E. Bock. *Effect of Fires on Woody Vegetation in the Pine-grassland Ecotone of the Southern Black Hills*. The American Midland Naturalist, 112(1), 1983, 35. When wildfires are absent in ponderosa pine forests that naturally burn every 10-25 years, dense stands of dog-haired pines result. Dog-haired pines are dense spindly pine stands in the forest understory.

⁶ Hollis Marriott and Ronald L. Hartment, 1986.

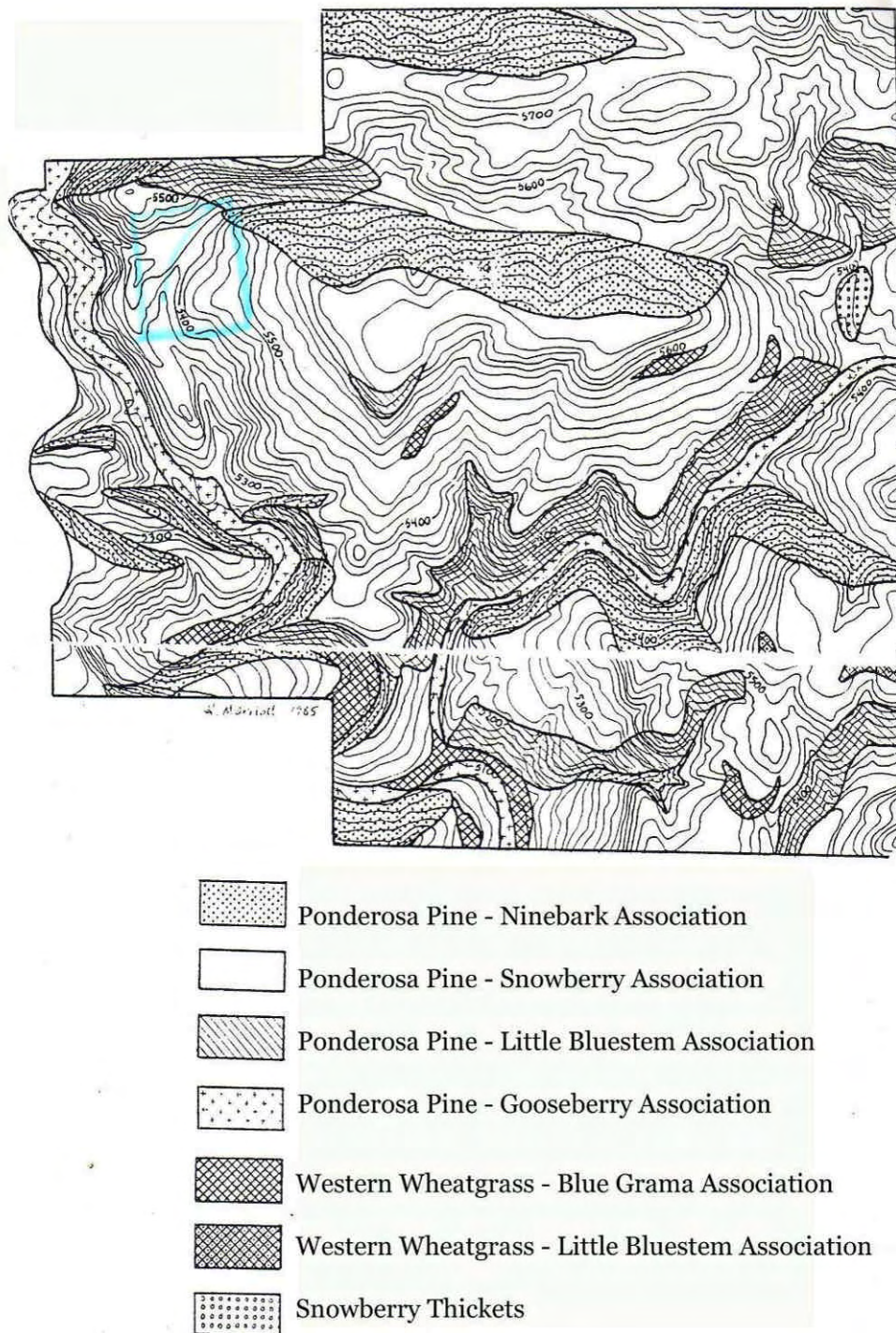


Figure 3.4: Vegetation Associations of Jewel Cave National Monument
(Source: Marriott and Hartment, 1986, "A Survey of the Vegetation of Jewel Cave")

Domestic vegetation at the historic site is minimal, consisting of a few *Juniperus* sp. near the Ranger Cabin.

Circulation

There are currently two means of access to the historic area. One can use a private vehicle or walk into the site. Park managers are considering adding a shuttle from the visitor center to reduce the impacts of overcrowding in the small historic area parking lot.

Vehicular Circulation

The historic site can be accessed by automobile via U.S. Highway 16. A reconstruction of the historic ca. 1940's entrance sign demarcates the entrance road to the historic area. The site entrance road follows its historic alignment that gently curves and slopes displaying the ponderosa pine forest surrounding the site. The road ends for visitors at a loop and small parking area, a short distance from the historic Ranger Cabin. Visitors can park and walk up the trail to the Ranger Cabin and wait at the seating area for their tour to begin.

Two service roads extend from the end of the loop road, providing access for NPS vehicles. The eastern-most road, Service Drive "B", extends from the visitor parking area to the southeast and dead ends at a small paved area and the pumphouse. Service Drive "A" is roughly parallel to Service Drive "B." It is located between the path that leads to the Ranger Cabin and Service Drive "B." It provides access to a small parking area for NPS employees, near the circular tour waiting area. A small structure for storing lanterns for the cave tour was constructed at the end of this road in 2003.

Pedestrian Circulation

Pedestrian access to the historic site is provided via the Canyons Trail that begins at the main Monument visitor center and passes through the historic area and Hell Canyon.

Pedestrian circulation within the site is simple and straightforward. A short trail surfaced with fine crushed stone provides access from the parking lot to the historic Ranger Cabin. The trail was previously paved with asphalt, but the pavement was removed in 2003 to fix a leaking water line that runs beneath the trail. The trail then continues past the front of the cabin to the south. The trail is paved in concrete from the circular seating area to the cave entrance. A series of stone steps are located along the upper portion of the trail, leading to a narrow stairway in a stone crevice. At the stone crevice a CCC-constructed stone stairway traverses the terrain to the lower trail. The lower trail is concrete with a short, NPS-constructed stone retaining wall on the up-slope side in one area. A larger CCC-constructed retaining wall on the downslope side of the trail is mostly disguised by vegetation planted for that purpose. The trail is fairly level, and wraps around the edge of the canyon wall toward the cave entrance. The Canyons Trail continues past the cave entrance into Hell Canyon.



Figure 3.5: Cabin, service road, and path 2003 (source: QE|A 2003 Roll 7 14)



Figure 3.6: Service road and path from parking (source: QE|A 2003 Roll 7 22)

Structures and Small-Scale Features

The Jewel Cave Historic Area includes historic and non-historic structures and small scale elements. A description of the individual structures and other features present at the site and their current condition is included in Table 1. The historic Ranger Cabin is an important extant feature that establishes the character of the area as a historic site. The oversized log construction techniques utilized by the CCC give the building a sturdy and rugged appearance associated with the historic period (1930's). The reconstructed entrance sign, and the trail and stone steps that lead to the historic cave entrance, reinforce the historic character of the area, exhibiting use of natural materials and attention to design details reminiscent of the 1930's CCC construction techniques. It was installed in the 1990s, and its design is closely based on the original, which is located in the Monument's museum collection.

A stone retaining wall located on the east side of the path and railings along the paths have been added as necessary to control erosion or provide assistance to visitors.

Site furniture includes picnic tables, half-log benches, trash receptacles, and directional signs. These elements are consistent with those used throughout the park. Modern site elements that do not contribute to historic character include the pump building, portable toilets, drinking fountain, and a lantern shed.

The Michaud archeological site includes some remnants of stone foundation walls and a later concrete manhole-type structure at the spring.



Figure 3.7: Manhole Structure at Seep/Spring near former Michaud Hotel Site (source: QE|A 2003, Roll1 AA007A)



Figure 3.8: HWY 16 and Remnants of Stone retaining wall at site of the former Michaud Hotel (source: QE|A 2003, Roll 8 5.2A and 4.1A, merged)



Figure 3.9: Site of Non-Extant Michaud Hotel (source: QE|A 2003, Roll1 AA013A)



Figure 3.10: Historic Area Entrance Sign 2003 (source: QE|A 2003 Roll8 9.4A)

Views

Important views within the historic district include those to and from the cave entrance, and views in the area around the Ranger Cabin and along the trail to the cave entrance.

Cave Entrance Views

Views to and from the cave entrance are dominated by the steep topography and rock outcrops surrounding Hell Canyon and the Ponderosa pine forest that blankets the hills. The only cultural elements viewed within this predominantly natural scene are those associated with the CCC developments within the historic area, the road cut for Highway 16, and occasionally a vehicle traveling along the road.

From Highway 16, one can identify the large rock outcrop that surrounds the cave entrance and stands out against the vegetation-covered landscape that surrounds it. The Ranger Cabin and lower trail to the cave entrance are also visible to the discerning eye.



Figure 3.11: Cave Entrance from across Hell Canyon (source: QE|A 2003, Roll 8, 31.15A)



Figure 3.12: Cave Entrance 2003 (source: QE|A 2003 Roll 8 30.14A)



Figure 3.13: View from Cave Entrance (source: QE|A 2003, Roll 6, AA000A)

Ranger Cabin Views

Existing views from the Ranger Cabin in all directions are filled with ponderosa pine trees, steep topography, and rock outcrops. Views from the front porch to the east include Service Road “A,” the lantern storage building, and any cars parked in the small lot. The circular seating area with log benches is also dominant in the view. Service Road “B,” across the draw, is visible to the attentive viewer. To the north, the visitor’s parking lot, cars, and bright green portable toilets are visible through the ponderosa pines. During the 1970s there were electrical lines and a pole-mounted light fixture in the area, but their locations are not documented.

Stone Stairway

A dramatic view is provided of Hell Canyon and the lower path to the cave entrance from the stone stairway as one descends from the upper path.

Archeology

An archeological survey of the National Monument was completed in 1998. The report indicates that one prehistoric site and three historic sites have been documented within the historic district. Of these, one is potentially eligible for the National Register. The historic site of the Michaud Hotel (39CU844) contains two potentially contributing above-ground resources; portions of a stone building foundation and the cement manhole at the spring. The building foundation is a remnant of the Michaud hotel. The manhole was constructed by a CCC crew. Archeological fieldwork has been completed by Bruce Jones of the Midwest Archeological Center and a final report is being prepared. Archeological resources located in Hell Canyon include the Hell Canyon Road, a concrete foundation, and remnants of a masonry fireplace.

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Table 1: Existing Structures and Features

Historic Structure/ Feature	Figure Number	Description	Condition
Ranger Cabin	3.23	CCC-constructed log cabin, built 1935	Good
Upper Trail to cave	3.24-3.35	4' concrete path was altered in 1960's, and again ca.1980s, some structural problems exist.	Fair
Stone Stairway	3.14, 3.36	CCC-constructed 1939, some minor alterations	Fair
Metal railing at top of stairway	3.33-3.37	Simple pipe rail at edge of path	Good to Fair
Lower trail to cave	3.14 3.37-3.44	This historic route was established by the CCC. The current 4'-wide concrete pavement was installed recently.	Fair
CCC-retaining wall	3.14, 3.37, 3.39	Stone wall was constructed and covered with earth and vegetation by CCC. Some erosion is exposing the stones.	Fair
Cave entrance area	3.11-3.13, 3.44	Pavement widens and terminates at iron gate to cave entrance. Interpretive site includes a bench and sign overlooking Hell Canyon.	Good
Historic Area Entrance Road	3.45-3.46	CCC-constructed road alignment into site.	Good
Michaud Archeological Site	3.8-3.9	Archeological site # 39CU844, with remnants of stone foundation.	Fair
Manhole at the Seep/Spring	3.7	CCC-constructed, repaired by NPS	Good
Remnant of trail west of Ranger Cabin	3.15	Informal trail indicates portion of earlier route to the cave entrance.	Fair
Ponderosa pines in historic area	3.15-3.25 3.37, 3.45	Many of these trees have been present for over 300 years. Most were scorched by the Jasper fire in 2000.	Fair
Highway 16	3.8-3.9 3.13	The historic alignment from Custer to the Jewel Cave historic area was established by 1901 (good condition). Highway 16 between Custer and Newcastle was completed in 1928 and went down Lithograph Canyon (poor condition).	Good/Poor
Building fdtn. remnants in Hell Canyon	3.47	Portions of concrete foundation.	Fair
Fireplace remnants in Hell Canyon	3.48	Fireplace remnants impacted by weather, vegetation, and structural deterioration. ⁷	Poor
Hell Canyon Road	3.49	Route is maintained for fire vehicle access. Cattle guard installed by CCC remains. The route is washed out in two places.	Fair to Poor
CCC-const. cistern	3.50-3.51	Concrete cistern constructed by CCC crews. Located on a rise near the Ranger Cabin.	Fair
Former Campground Site	3.17	Site of non-extant NPS campground. Large rocks exclude vehicular access.	Good

⁷ Sheveland, Genna J. *A Level III (Intensive) Cultural Resource Survey of Jewel Cave National Monument*. Custer, South Dakota: United States Department of the Interior, National Park Service, 1998. Sheveland documents this as archeological site 39CU1314, Hell Canyon Cabin. In 1998, there was a dugout in the hillside nearby that was supported by timber supports. During Williams' site visit in 2003, these timbers were no longer apparent. They were burned during the Jasper fire in 2000. It is possible that the dugout structure was used to store dynamite for CCC construction projects. Sheveland indicates that the cabin site probably represents a late 1800 or early 1900 homesteader's cabin. It is probably not related to the Michauds, as it was located outside of their claims.

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Compatible Feature		Description	Condition
NPS retaining wall	3.38-3.39	Stone retaining wall on the upslope side of the lower trail between the stone stairway and the seating area. Height varies from 2' to 3'-6". A 15' long portion of the wall is deteriorating.	Fair to Poor
Benches	3.40	Half-log benches echo the material and character of the historic Ranger Cabin. Installed before 1980.	Good
Directional Signs	3.13, 3.45 3.53	Small, simple signs indicating the locations of the Canyons Trail.	Good
Historic Area Entrance Sign	3.10	Reconstructed ca. 1940's entrance sign	Good
Stone steps on upper trail	3.26-3.32	Added or altered in 1960's. Added and altered again in the early 1990s.	Fair
Visitor Parking lot	3.45-3.46	Small gravel lot for about 10 cars.	Fair
Seating area on lower trail (Wayside #1)	3.40	Two benches at widened area in trail, under a rock ledge at a secondary cave opening. Site is interpreted.	Good
Service Drive "B"	3.53	Chip and seal pavement, turf is breaking through in some areas.	Fair
Stainless steel Gate at cave entrance	3.52	This gate is modeled after the original iron gate that is in the park's museum collection. The gate controls visitor access to the cave and includes horizontal openings to facilitate bat flight in and out of the cave.	Good
Non-Contributing Feature		Description	Condition
Portable toilets	3.46	Bright colored fiberglass 4'x4' portable building.	Good
Lantern storage shed	3.20, 3.22, 3.54	Approximately 4' x 6' x 5' tall log shed with shake-shingle shed roof. Eye wash station is adjacent.	Good
Service Drive "A"	3.5-3.6, 3.20-3.22	Chip and seal pavement.	Good
Pump Building	3.18	Concrete block shed painted brown, shed roof.	Good
Well cap	3.18	3' tall gable roof structure painted brown. The foundation of the structure appears to be settling and may need to be stabilized.	Fair
Drinking fountain	3.54	Concrete drinking fountain.	Good
Circular seating area near cabin	3.21-3.22 3.24, 3.54	Gravel area with log benches.	Fair
Rocks at edge of employee parking area	3.22, 3.54	Large rocks along the edge of Service Drive "A" and near the circular seating area.	n/a
Shrubs around the Ranger Cabin		Juniperus sp. at front and north side of the Ranger Cabin.	Fair
Utility poles, lines, boxes		Overhead utility lines and poles.	Good

Cave Resources

Because of the lack of natural regenerative processes, Jewel Cave is a non-renewable resource; all impacts are cumulative and essentially permanent. The cave system is entirely beneath the surface. Activities on the surface will affect the cave environment only if they cause changes impacting the exchange of matter and energy between the surface and the cave. Such exchange results from the movement of air, water, people, and animals. Air, people, and animals can only enter and leave the cave via the entrance. Water can enter the cave by gravity via fractures in the limestone, but is limited by impermeable geologic layers.

1. Water Resources

There are several wet cave areas beneath the visitor parking area, and the cabin parking area. Some of these contain actively forming speleothems.

2. Geologic Resources

Impacts consist of trail degradation, offtrail disturbances (tracking), inadvertent damage to speleothems, and deliberate damage to or defacement of speleothems or other cave features.

The presence of manganese makes the matter of tracking one of the foremost management concerns. There are deposits of manganese minerals throughout most of the cave. These deposits are fine-grained and dark in color. They stain clothing and cave surfaces. Traveling through the cave can result in tracking these dark deposits onto adjacent limestone and calcite, leaving footprints, handprints, and smudges wherever people come into contact with cave surfaces. This is known as “manganese tracking.”

Finally, some speleothems, such as hydromagnesite balloons, gypsum beards, and calcite rafts are extremely fragile and can be easily damaged by human activity. There are not any of these formations in the cave passages beneath the Historic surface area.

3. Macrobiotic Resources

All small caves in the area are home to various common vertebrates and invertebrates. The caves are essential shelters for these surface dwelling animals. Various bat species are known to frequent the small caves in limited numbers. The passages of Jewel Cave within about 1000 feet of the entrance serve as summer roost and winter hibernaculum for at least six species, including five *Myotis* species and a large population of *Corynorhinus townsendii* (Townsend's Big-eared bat). The former occur in numbers of 250-500, and the latter ranges from 600 to 1,100 individuals. Jewel Cave is presently one of the world's largest known hibernacula for the *Corynorhinus townsendii* (Townsend's Big-eared bat). There are no known vertebrates or invertebrates that are cave adapted.

4. Microbiotic Resources

Along the Historic tour route, Moore (1996) found heterotrophic bacteria and fungi in densities approaching those found in soils collected outside the entrances. These high densities closely paralleled lint deposition from visitors traveling in those areas. Common protozoa were found throughout the cave. Nematode and arthropod populations were largely restricted to the entrances,

tour route, and well-traveled corridors. The ecosystem is largely detritus-based, probably as a result of human activity.

Recent discoveries in other National Park Service caves have shown that microbiologic communities can exist in the low-energy environment present deep within the larger cave systems. These microbes are cave adapted and often differ uniquely from their surface counterparts. A single in situ sampling effort in 2001 has confirmed the presence of microbes at the farthest known reaches of Jewel Cave, but researchers did not attempt to culture, classify, or identify them (Northup 2002).

Water Quality

Except for three springs (actually large seeps), there are no perennial surface water resources within the monument. Hell Canyon and Lithograph Canyon are subject to occasional flash flooding, particularly during the spring rains and snowmelt. Jewel Cave Spring was developed in the 1930s and does not presently have surface flow; it is not certain that it ever did.

The three springs were extensively monitored for water quality for three years in the early 1990s. The resulting data has been compiled into the national STORET database. Ongoing efforts monitor lead, nitrates, and chlorides at these three springs on a monthly basis. Two springs (Jewel Cave Spring and Prairie Dog Spring) adjacent to U.S. Highway 16 are subject to high chloride concentrations, presumably from highway runoff bringing in salts from winter de-icers.

Wildlife

A fairly complete list of vertebrate fauna has been compiled at Jewel Cave National Monument. The list includes 88 species of birds, 29 species of mammal (including 11 species of bats), 2 species of reptiles, and 4 species of amphibians. There are no species of fish present within the Monument. A list of common vertebrates can be found in Appendix A.

Large mammals include white-tail and mule deer, elk, bighorn sheep, and mountain lions. Because Jewel Cave consists of two square miles of park land surrounded by Forest Service land, these animals frequently pass through the Monument without necessarily making it their home.

Over 300 species of invertebrates have been documented, and list of common invertebrates can be found in Appendix A.

Threatened and Endangered Species

The only federal- or state-listed species occasionally present in the Monument is the bald eagle (*haliaeetus leucocephalus*). It is federally listed as threatened and also listed by the state of South Dakota as threatened. No nest sites are known within the Monument, particularly near the historic area.

Visitor Use and Experience

Overall visitation at Jewel Cave National Monument since 1996 has experienced a steady, slight decline, with the exception of 2002. The total visitation for 2003 was 122,369. An estimated 24 percent of total Jewel Cave National Monument visitors (number taken from traffic counters in visitor center area and at Historic Area entrance road) visit the Historic Area.

	Total Park Visitation	Historic Area		
		Lantern Tour	Non-tour ranger contacts	Traffic Counter
1996	144,983	7,993	N/A	N/A
1997	133,393	7,718	N/A	N/A
1998	131,313	8,689	N/A	N/A
1999	131,253	9,469	N/A	N/A
2000 ^A	129,445	6,017	1,920	14,246
2001 ^B	125,678	5,417	1,936	12,583
2002	131,599	7,655	1,795	12,509 ^C
2003	122,369	7,417	226 ^D	16,002 ^D

^A The Jasper Fire resulted in the closure of the monument between Aug. 25 - Sept. 2, 2000. The Historic Area is traditionally open through Labor Day.

^B Statistics for the Historic Area for Labor Day, 2001 are missing.

^C Traffic counter for Historic Area stats available only through Aug. 20, 2002; traffic counter cable sliced during chip/seal project.

^D Traffic counter not installed until 6/11; personnel scheduling changes meant that the area was unstaffed while rangers were giving tours.

The majority of U.S. visitors to Jewel Cave National Monument tend to be from outside of the state, with most from Minnesota, followed by California.⁸ Visitation in the Historic Area is comparable to overall monument visitor makeup, with the majority being families, followed by groups of friends or combinations of friends and family. Occasionally, organized groups such as scouts or church groups participate in ranger-guided historic tours. A number of visitors to the Historic Area are those approaching from the west who enter the area without the understanding that the main visitor facilities are actually one mile further east.

Jewel Cave's Historic Area is located one mile west of the primary park entrance, just off of South Dakota Highway 16. This area is open on a seasonal basis (approximately Memorial Day through Labor Day). Participating in the historic tour

is the primary visitor activity in the Historic Area. Candle lanterns were replaced with oil lanterns in 2003 (primarily in response to mold growth problems on dripped candle wax in the cave). Historic tours are limited to 20 persons, with a minimum age of 6 years for safety reasons. Tickets for these tours are sold at the monument's visitor center.

Historic Area visitor facilities currently include the historic Ranger Cabin, CCC-era foot trail between the historic cave entrance and the cabin, two parking areas (employee, near cabin, and visitor, below cabin), four to eight picnic tables (this varies from season to season), three to six portable toilets (also varies seasonally), and trailheads. Access to the area is currently via personal vehicle by way of Highway 16 and the Historic Area entrance road, or by foot trail. The Canyons Trail is a 3.5 mile loop between the Historic Area and Visitor Center area, with area trailheads at the Visitor Center and just east of the Historic Area parking lot.

The Historic Area offers visitors an opportunity to experience the early history of the monument by visiting the Ranger Cabin and the historic entrance to the cave, as well by participating in the Lantern cave tour. Restoration of the Ranger Cabin has enhanced visitor understanding and appreciation of the structure. Hikers on the Canyons Trail use the Historic Area as a rest stop along the trail. The small picnic area appeals to those who wish more shade and quiet than what is available in the vicinity of the visitor center.

⁸Skalitsky, T. 2003. Satisfaction and Visitor Knowledge at Jewel Cave National Monument, South Dakota. *Master's Thesis, Dept. of Forestry, Southern Illinois University Carbondale.*

Socioeconomics

Jewel Cave National Monument is located 13 miles west of Custer, South Dakota (pop. 1800), and 24 miles east of Newcastle, Wyoming (pop. 3000). Newcastle has been growing slowly in recent years, and Custer has been growing much more rapidly. Rural development has been on the rise on either side of the Monument, but particularly to the east, in the Pass Creek area. Custer, South Dakota, the nearest city to Jewel Cave, has a population of 1,860 individuals, while Custer County has 7,370 individuals. Racially, the county is primarily white (94%), with American Indian ethnic groups making up the next highest category with 3.1%. While the median income of Custer City is slightly below the state average (\$31,739 for Custer City compared to \$35,282 for South Dakota), the county median income is slightly higher than the state average (\$36,303 for Custer County). Custer County has a tourist-based economy centered upon outdoor pursuits and industry. The Agriculture, Forestry, and Mining Trades and the Arts, Entertainment, and Recreation Fields both employ 12-percent of the population, or 24% total. The only higher employment sector is the education and social services, making up 20% of the employment base in the county.

Solid Wastes

Solid waste from Jewel Cave National Monument is taken to the Rapid City Landfill, located roughly one hour north of Custer, SD. This 450-acre landfill has been open since 1960 and accepts an average of 300-350 tons of non-hazardous solid waste per day. The landfill attempts to recycle as many materials as possible, including large scale recycling of yard waste and asphalt. About 2 tons of asphalt and 15,000 tons of

yard waste are received by the landfill each year. The asphalt is ground-up and used either on site or sold back to the public. Any yard waste is composted and sold to the public as an organic soil amendment. Other materials accepted by the Rapid City Landfill include cardboard, mixed recyclables (glass, aluminum, plastic), and scrap metals.

Utilities

The area includes two wells and one pump house, buried water lines a sewer line and septic system, aerial and buried power lines, and buried phone lines.

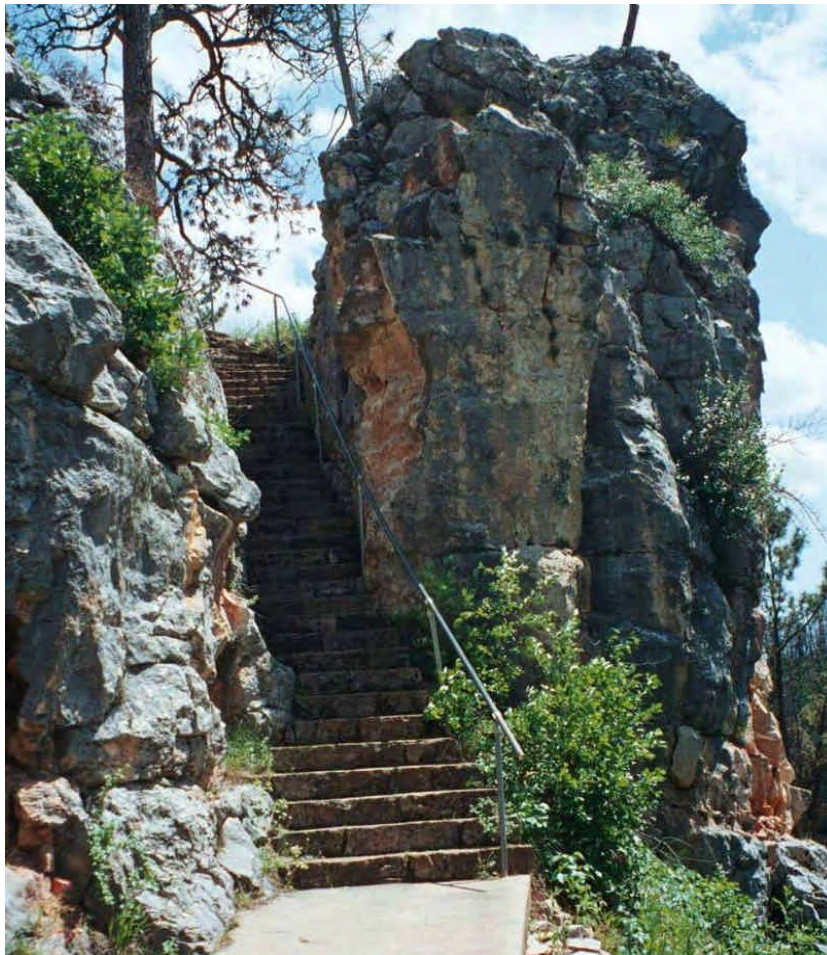


Figure 3.14: Stone CCC Stairway viewed from lower trail (Source: QE|A 2003, Roll5-2)



Figure 3.1: Former parking area on southwest side of Ranger Cabin. (Source: QE|A 2003, Roll3-16)



Figure 3.2: Former NPS campground site is barely discernible in 2003. (Source: QE|A 2003, Roll7-17)



Figure 3.3: Pump building and cap. (Source: QE|A 2003, Roll7-16)



Figure 3.4: Landscape along the Canyons Trail between the historic area and the Monument visitor Center, east of the historic area. Damage from the Jasper Fire of 2000 is still very much apparent in 2003. (Source: QE|A 2003, Roll7-23)

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Figure 3.5: Southern end of Service Drive "A," note former developed area in the distance, gravel stockpile, eyewash station, and lantern storage shed. (Source: QE|A 2003, Roll2-20)



Figure 3.6: View to southeast from Ranger Cabin. Note former driveway, parking area, former developed area in background, and circular seating area. (Source: QE|A 2003, Roll2-5)



Figure 3.7: Lantern Storage and Eyewash Station (source: QE|A 2003, Roll2, AA007A)



Figure 3.23: Ranger Cabin, South side (Source: QE|A 2003, Roll3, AA000A.jpg)



Figure 3.84: Upper trail to Cave entrance, from Ranger Cabin facing south (Source: QE|A 2003, Roll4-1)



Figure 3.25: Upper trail to Cave entrance, from south of seating area facing south (Source: QE|A 2003, Roll 4-4)



Figure 3.26: Upper trail stone steps 1, 2, and 3 (Source: QE|A 2003, Roll4-8)



Figure 3.27: Upper trail stone steps 3, 4, and 5. The double-step configuration shown is a recent (ca. 1980s-1990s) modification and is awkward to negotiate. (Source: QE|A 2003, Roll4-9)



Figure 3.28: Upper trail stone steps 6, 7, 8, and 9 (Source: QE|A 2003, Roll4-10)



Figure 3.29: Upper trail stone step 10, deteriorating concrete (Source: QE|A 2003, Roll4-12)



Figure 3.30: Upper trail stone steps 10 and 11 (Source: QE|A 2003, Roll4-13)



Figure 3.31: Upper trail stone step 12, cracking edge (Source: QE|A 2003, Roll4-14)



Figure 3.32: Upper trail stone step 13, pulling away from concrete (Source: QE|A 2003, Roll4-16)



Figure 3.33: Upper trail curve near stairway, failing concrete (Source: QE|A 2003, Roll4-18)



Figure 3.34: Detail of structural failure at curve in upper trail (Source: QE|A, Roll4-20)



Figure 3.35: Pine at curve in upper trail (Source: QE|A, Roll4-24)



Figure 3.36: View down the CCC stone stairway (Source: QE|A, Roll4-26)



Figure 3.37: View of Lower trail and area of CCC retaining wall from stone stairway (Source: QE|A 2003, Roll5-1)



Figure 3.38: Lower trail facing north, NPS constructed stone retaining wall on right. Note impacts from vegetation and erosion. (Source: QE|A 2003, Roll5-3)



Figure 3.39: Lower trail facing north, area of CCC retaining wall to left. Cover over stones is thin in places, exposing the wall materials. (Source: QE|A 2003, Roll5-4)



Figure 3.40: Wayside #1 with benches along lower trail at opening in rock. This is presently called "Bush's Cave." The diagram illustrated in Figure 2.43 indicates that it was referred to as "Shelter Cave" in 1946. (Source: QE|A 2003, Roll5-10)



Figure 3.41: Tree at lower trail's edge about 60' north of wayside #1. Concrete is in poor condition in several areas along the lower trail. (Source: QE|A 2003, Roll5-13)



Figure 3.49: Lower trail concrete in poor condition near small cave opening located to the south of the historic cave entrance. (Source: QE|A 2003, Roll5-16)

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Figure 3.43: Small cave opening located to the south of the historic cave entrance. The Monument staff do not use a name for this opening currently, however, according to Figure 2.43 it was called “Bear Pit Cave” in 1946. (Source: QE|A 2003, Roll5-17)



Figure 3.44: Historic Cave Entrance. (Source: QE|A 2003, Roll5-22)



Figure 3.45: Entrance road and parking, facing north (Source: QE|A 2003, Roll7-1)



Figure 3.46: Parking area, picnic area, and portable toilets. (Source: QE|A 2003, Roll7-13)



Figure 3.47: Concrete foundation, remnant of former structure in Hell Canyon. (Source: QE|A 2003, Roll 1-23)



Figure 3.48: Remnants of fireplace in Hell Canyon. (Source: QE|A 2003, Roll 1-22)



Figure 3.49: Hell Canyon Road. (Source: QE|A 2003, Roll 1-24)



Figure 3.50: CCC-Constructed Cistern. (Source: QE|A 2003, Roll 1-17)

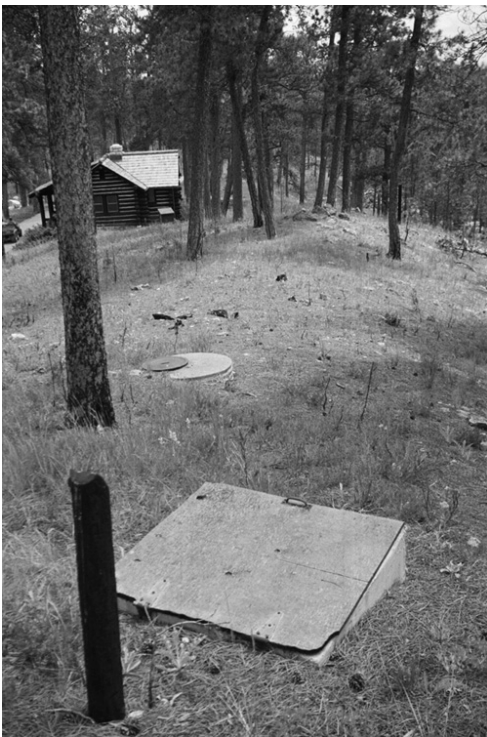


Figure 3.51: CCC-Constructed Well Cap and Cistern in relation to the Ranger Cabin. (Source QE|A 2003, Roll 1-16)



Figure 3.52: Gate at cave entrance. (Source: QE|A 2003, Roll5-22)



Figure 3.53: Service Drive “B” and directional sign. (Source: QE|A 2003, Roll7-15)



Figure 3.54: Lantern storage shed, eyewash station, circular seating area, and drinking fountain. (Source: QE|A 2003, Roll 2-7)

Chapter IV:
Cultural Landscape Analysis

CHAPTER IV: CULTURAL LANDSCAPE ANALYSIS

National Register Status

Historic features associated with Jewel Cave National Monument are listed in the National Register of Historic Places under a Multiple Property designation that was accepted in April 1995. The “Jewel Cave National Monument Multiple Property Submission” includes three associated property types: 1) Resources associated with tourism and the early development of Jewel Cave, 1890-1944; 2) Resources associated with the development and administration of Jewel Cave National Monument, 1908-1944; and 3) Resources associated with NPS rustic architecture and Public Works Construction, 1933-1942. The CCC Ranger Cabin, the cave entrance and the trail leading from the Ranger Cabin to the historic cave entrance are listed in the National Register as contributing resources associated with the Jewel Cave Multiple Property listing.

Jewel Cave Historic Landscape District Boundary

The analysis and evaluation conducted as a part of this CLR indicates that the proposed historic district is eligible for listing in the National Register. The historic district boundary is defined as the area where the original National Monument boundary overlaps the current National Monument boundary. The boundaries and proposed district are illustrated in **Figure 4.1**.

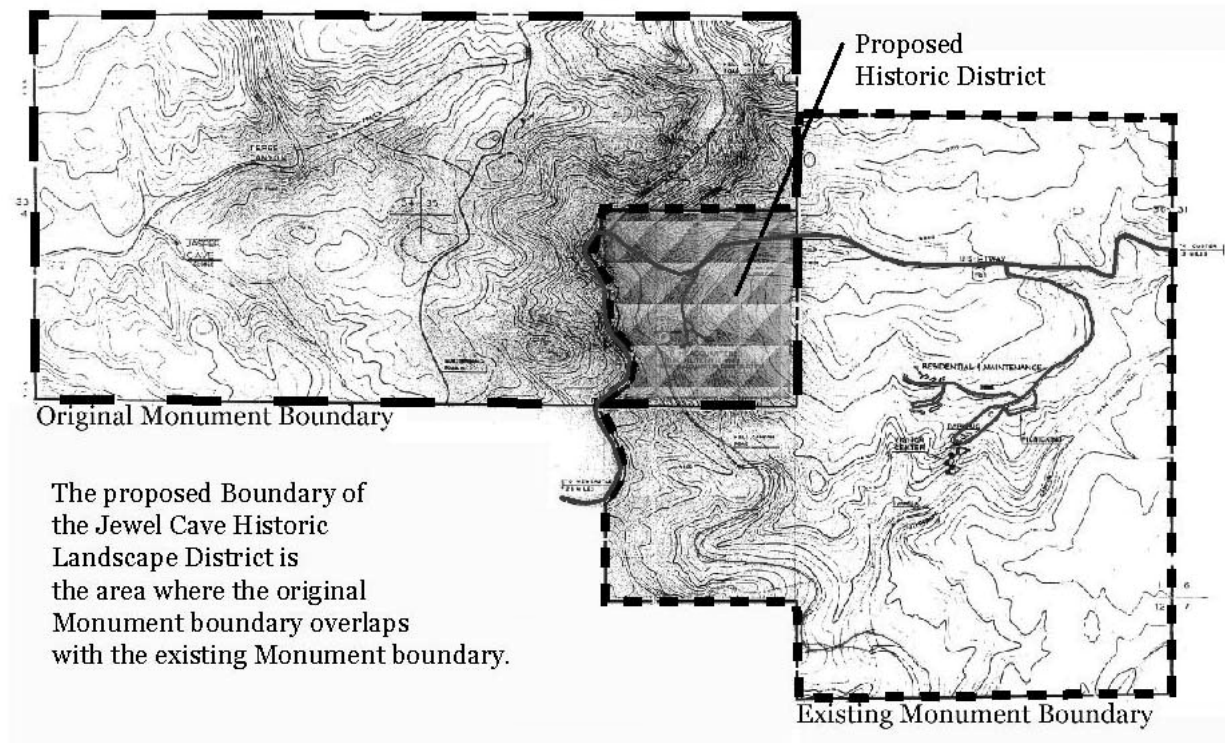


Figure 4.1: Original Monument Boundary overlapped with the Existing Monument Boundary. (Source: revised by QE|A from NPS 000490.tif, General Development of JEWEL CAVE, 1951)

Figure 4.2 provides a more detailed diagram of the proposed district which includes four component landscapes including:

- 1) the Historic Developed Area, Ranger Cabin, upper trail to cave, stone steps on trail, stone stairway, metal railing at top of stairway, lower trail to cave, CCC retaining wall, cave entrance area, historic area entrance road;
- 2) the Michaud archeological site, includes the site of the non-extant Michaud Hotel and the remnants of the stone foundation, and the manhole at the spring;
- 3) US Highway 16 includes the highway; and
- 4) Hell Canyon Road area includes the road alignment, the remnants of a brick fireplace, and remnants of a foundation of a building. Research conducted as a part of

the CLR indicates that each of the component landscapes contribute to the existing National Register multiple property designation.

Although the majority of the contributing cultural resources are located within the Historic Developed Area indicated in **Figure 4.2**, the larger district boundary is justified due to its representation of the long-term jurisdictional boundary associated with the National Monument. Within the district boundary, the harvesting of timber has not been allowed since the original creation of the National Monument in 1908, and it is unique in possessing a remnant of an old growth pine forest. The district also contains all of the historic resources associated with the property. Finally, the boundary is definable based on historic documentation and legal descriptions.

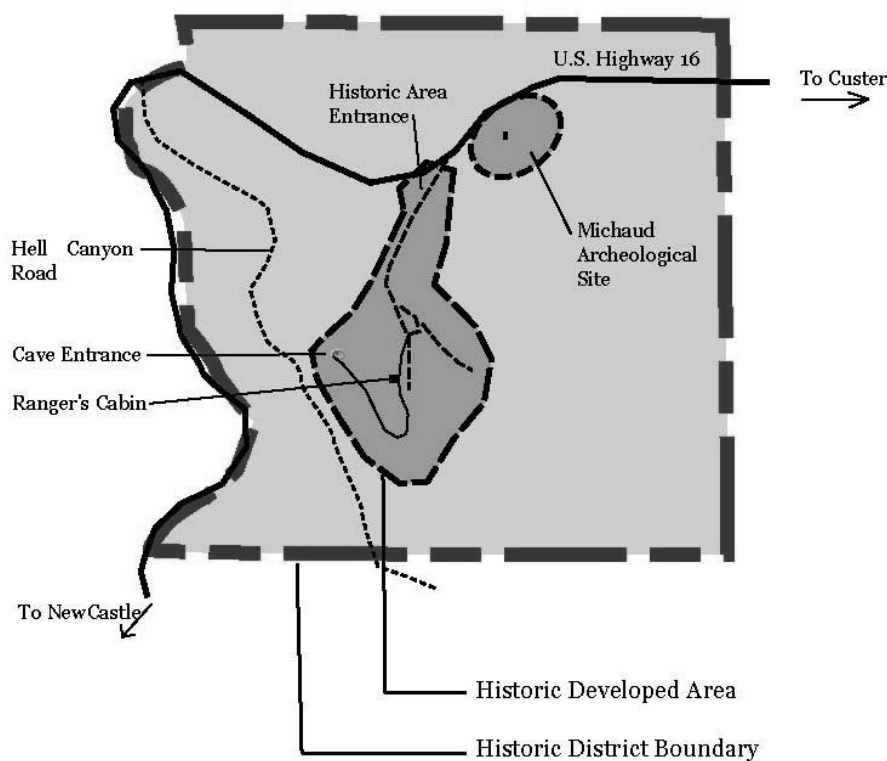


Figure 4.2: Detail of proposed historic district boundary. (Source: QE|A 2003, adapted from U.S. Department of the Interior, National Park Service, Branch of Engineering, "Topographic Map, Part of the Master Plan for Jewel Cave National Monument," January 1, 1942. Drawing number NM-JC, 5300A.)

Jewel Cave Historic Landscape District Significance

The proposed Jewel Cave Historic Landscape District is significant according to National Register Criteria A and C. According to the multiple property nomination, the property consists of three associated property types including: those associated with tourism and the early development of Jewel Cave from 1890 through 1944; resources associated with the development and administration of Jewel Cave National Monument from 1908 through 1944; and resources associated with NPS rustic architecture. **Table 1** provides descriptions of each of the contributing elements and their associated property type. **Table 2** describes elements that are non-historic, but are compatible with the historic integrity of the district. **Table 3** enumerates non-contributing elements.

Associated Property Type One Description

Property type one includes resources associated with tourism and the early development of Jewel Cave from 1890 through 1944. Resources within this category were “conceived and developed as tools for encouraging recreation and tourism in the Black Hills, especially in the Jewel Cave vicinity.” Properties designed and developed by the National Park Service are excluded from this category.¹

Property Type One, Registration requirements

- Must be within current boundaries of Jewel Cave National Monument
- Criterion A: must be directly associated with tourism or recreation and demonstrate clear and positive patterns of usage related to this topic.
- Criterion C: must embody the distinctive characteristic, types, and methods of construction of the period, especially as they relate to tourism and recreation.

¹ Karsmizki, National Register Nomination, p. 5

Property Type One, Eligible Resources

The Michaud archeological site, Highway 16, and the Hell Canyon road, fit within this category.

- Michaud archeological site: The site represents the earliest development for accommodating visitors to the cave. The hotel was built to provide a location for cave visitors to sleep and eat, thereby enabling their cave visit in the earliest years when the site was most difficult to access.
- Highway 16: Recognizing the importance of good access, local citizens and organizations advocated for public funds to be allocated for the development of transportation facilities in the Black Hills. The combined efforts of private owners, booster organizations, and concerned citizens, and responses made by governmental organizations including state highway planners and state and federal elected officials, played a major role in developing Highway 16 as an accessible route to Jewel Cave.
- Hell Canyon Road: The naturally accessible route through the bottom of Hell Canyon from the southern Lithograph Canyon route provided an early trail.
- Archeological site in Hell Canyon: remnants of masonry fireplace.
- Archeological site in Hell Canyon: concrete building foundation.

Associated Property Type Two, Description

Associated property type two includes resources associated with the development and administration of Jewel Cave National Monument from 1908 through 1944. These are resources directly associated with NPS development and administration of natural resources within the present boundaries of Jewel Cave National Monument. Elements originating from NPS design principles and products of the Civilian Conservation Corps projects are eligible.

Associated Property Type Two, Registration Requirements

- Must be within current boundaries of Jewel Cave National Monument
- Criterion A: eligible if they “were intended to enhance public viewing and appreciation of the national monument and its natural resources or to provide for the administration and operation of the facility.”
- Resources must have been developed by the NPS or the CCC.
- Public recreational resources are eligible under Criterion C if they were designed according to the NPS design principles of appropriate park design and “embody the distinctive characteristics of types and methods of construction of the period.” For Jewel Cave National Monument, eligible resources must display such character-defining qualities as log construction, use of local rock, and a scale and appearance in harmony with the surroundings. Examples should be evaluated for how they convey to the visitor that Jewel Cave National Monument is a National Park Service facility.
- Date between 1908 and 1944
- Alterations must continue the application of NPS design principles. Alterations more than 50 years old may be part of the historic fabric.
- Resources related to government efforts at conserving natural resources form a part of this property type. These resources should contribute to an overall recognition that one is indeed at an NPS site.
- Utility buildings not associated with an important theme related to park development are less likely to rank highly.
- Publicly oriented roads and trails are likely to rate highly due to visibility.

Associated Property Type Two, Eligible Resources

Properties that fall within this category include:

- Above-ground Resources within the Historic Developed Area (Ranger Cabin, upper and lower trails to the cave and the associated stone steps and stairway, metal railing at the top of the stairway, CCC retaining wall, cave

entrance area, historic area entrance road, remnant of trail west of the Ranger Cabin, ponderosa pines, site of former NPS campground).

- Resources outside the Historic Developed Area (ponderosa pines, manhole at the spring near the Michaud Hotel site)

Significance: “Federal activities regarding the conservation of natural resources represent a fundamental shift in American responses to the environment. The development of national monuments such as Jewel Cave illustrates National Park Service policies and principles which balance responsibility for preserving natural resources with public participation and appreciation of them. Important examples illustrate a key NPS design principle, that of establishing harmony between the built and natural environments.”

Associated Property Type Three, Description

Property type three includes resources associated with NPS Rustic Architecture. These resources are significant under Criterion A for their “association with the public works relief agencies of the Great Depression,” and under Criterion C for their relationship to the distinctive characteristics that have made park Rustic Architecture such an important facet of early park development.

Property Type Three, Registration requirements

- Must be historically associated with the context NPS Rustic Architecture and Public Works Construction and have construction dates within the 1933-1944 period of significance.
- Must retain high degree of integrity of design, materials, workmanship, and historic feeling.

- Design and construction methods of the Landscape Engineering Division and the Branch of Landscape and Design of the NPS, as well as the CCC and LEMs, must be apparent.
- Must possess a sufficient amount of historic fabric and workmanship to reflect their historic significance and rustic methodology of materials and construction. Additions or modifications must not impair the quality of historic integrity. Interiors must exhibit a rustic feeling not compromised by alterations.
- Each resource must retain its essential features that convey its historic function or character during the period of significance.
- Within a historic district, the majority of the resources must be contributing, with the historic elements that compose the district intact and apparent.

Property Type Three, Eligible Resources

Properties that fall within this category include:

- Ranger Cabin (CCC cabin)
- Upper trail to cave entrance
- Lower trail to cave entrance
- Cave entrance area
- Views to and from the cave entrance
- CCC-constructed retaining wall
- Stone stairway
- CCC-constructed cistern
- Remnant of trail west of Ranger Cabin
- Remnant old growth ponderosa pines in the historic area

The proposed district is significant for its representation of the original Monument boundary, as established by President Roosevelt in 1908. Because the

Monument boundary was revised in 1965, and only the area within the proposed historic district boundary reflects on-going management as a National Monument since 1908, the entire proposed district is significant. The vegetation within the proposed district is unique, because it has been protected from logging since 1908 and contains ponderosa pines that range from 100 to 300 years old.

Analysis of Integrity

The analysis and evaluation of landscape integrity provided herein follows guidelines provided by the National Park Service and National Register standards. In particular, two documents have been used, A Guide to Cultural Landscape Reports: Contents, Process, and Techniques, and National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes.² The Jewel Cave historic area cultural landscape analysis focuses on nine landscape characteristics including natural systems and features, spatial organization, land use, circulation, topography, vegetation, views, buildings and structures, and small-scale features. These landscape characteristics are the tangible and intangible aspects that collectively make up the historic character of the property. The analysis of these characteristics provides a summary of qualities and features that should be understood to protect or enhance the historic landscape through a historic landscape treatment plan.

² Page, Robert R., Cathy A. Gilbert, and Susan A. Dolan. 1998. A Guide to Cultural Landscape Reports: Contents, Process, and Techniques (Washington, D.C.: U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program); and McClelland, Linda Flint, J. Timothy Keller, Genevieve P. Keller, and Robert Z. Melnick. National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes (U.S. Department of the Interior, National Park Service, Interagency Resources Division).

The seven aspects of historic integrity are location, design, setting, materials, workmanship, feeling, and association. **Table 4** includes a summary of integrity for each of the component landscapes and landscape features within the historic area.

Natural Systems and Features

The Cave

The most significant natural system associated with the Jewel Cave Historic District is the cave itself. The Black Hills region was formed 60 to 70 million years ago when the North American Continent buckled and formed a domed uplift and the dramatic geological formations that are associated with the Black Hills. Jewel Cave is the third longest cave in the nation (exploration continues, and it is expected that it will soon be identified as the second longest cave in the nation) and includes notable formations of calcite crystals, flowstone, cave pearls, cave popcorn, dripstone, frostwork, and rare hydromagnesite balloons. Jewel Cave is a breathing cave, characterized by the movement of air through portals as exterior air pressure changes. The existence of Jewel Cave is the reason the Monument was established and the associated above-ground historic resources were developed. The focus of this *Cultural Landscape Report* is on the above-ground features, therefore the historic significance and integrity of the cave is not the focus of the current evaluation.

The Spring

Historically, the spring served an important role in providing potable drinking water for workers and visitors to the cave. The spring is believed to be an alluvial spring that was manipulated to collect water, acting like a cistern when the concrete manhole was installed by the CCC. It was utilized by the Michauds initially, and later

the CCC constructed a pipe system to provide water from the spring to the Ranger Cabin, Rangers Tent, and a drinking fountain. A line to the campground was added in the 1950s. The system supplied water for the needs at the historic area until 1961 when the natural water supply became inadequate. A pump installed in 1962 (at the end of Service Drive B) continues to provide water for the historic area today.

Spatial Organization

The overall spatial organization of the Historic Developed Area retains a high level of integrity. Alterations, mainly consisting of the addition of non-contributing elements, have been made to accommodate changing needs. Although a number of non-contributing elements have been removed from the Historic Developed Area, a few remain that are potentially confusing and distracting for visitors.

The addition of Service Road “A” in the early 1950s brought a more intense level of development and use to the historic core. From ca. 1950 until ca. 1970, the area contained several park housing units, utilities and storage buildings, and the administrative headquarters for the Monument. During that period, the view from the Ranger Cabin to the southeast included a road, a number of mobile homes and trailers, and vehicles. After the new headquarters, visitor center, and housing area were developed, the trailers were removed. A portion of Service Road “A” and a small employee parking area remain and can be plainly viewed from the Ranger Cabin and the historic trail to the cave entrance.

The addition of Service Road “B”, or at least a portion of it, occurred during the later portion of the period of significance when the campground was developed in the early 1940s. Although the campground has been disbanded, the service road remains.

The road continues to serve a maintenance-related purpose, and does not distract from the character of the historic core.

Land Use

Since the Michauds discovered the natural cave opening in 1900, the area around it has been consistently used to provide access to the cave, with developments being aimed at encouraging visitation by the general public. Beginning in the 1930s with the CCC activities at the site, the historic area served as a visitor contact station and orientation site, as well as staff office space and housing. From the 1950s until the 1970s the site provided campsites for visitors, housing for NPS staff, and the administrative and maintenance needs of the Monument.

The park administration, housing, and visitor facilities structures were removed from the site in the 1980s. These functions are now located within the main park developed area. The historic site serves as an interpretive area – a place where the history of the surface activities related to the cave can be explained to visitors and continues to provide a historic arrival experience to portions of the cave.

Circulation

The site's simple circulation patterns have remained intact throughout its development. The vehicular entrance road present during the CCC period (and perhaps earlier) continues to serve as the main access to the site connecting the historic core area with Highway 16. Although ongoing maintenance may have resulted in minor alterations to the road, no major changes to this route have been documented. The original loop has been adjusted and now provides recreational

vehicle parking spaces, car parking spaces, a small picnic area, and a space for portable toilets.

The addition of Service Roads “A” and “B” represent the largest changes to circulation at the site. The addition of at least a portion of Service Drive “B” occurred during the period of significance, and is not considered intrusive to the historic character of the historic core. Service Road “A” is very close to the heart of the historic core, and is confusing for visitors to the site.

Pedestrian circulation at the site retains a high level of integrity. The path between the parking lot and the Ranger Cabin has been adjusted with new grading, surfacing, and layout since the period of significance. However, it continues to serve essentially the same purpose and location as the original path. The historic path between the Ranger Cabin and the cave entrance that required steps adjacent to the cave entrance exists only as a remnant not connected to the lower cave trail. The trail developed by the CCC between the Ranger Cabin and the cave entrance, retains a high level of integrity. The upper portion of the trail was altered, the materials and steps were changed (ca. 1980s). The stone stairway through the rock crevice retains a high level of integrity, as does the lower trail.

Park managers are currently considering altering circulation to and from the historic site by initiating a shuttle system that would provide access from the visitor center. This system would help to alleviate parking pressure at the historic area, and could increase interpretive opportunities regarding the historic site.

Topography

The topographic character of the historic area has remained intact throughout the history of the site. The dramatic cliff in which the natural cave entrance was discovered was modified slightly to enlarge the opening and to provide pedestrian access in the 1920s and 1930s. The most significant change to the topography of the historic area was implemented by the CCC in 1938 during the construction of the lower surface trail to the cave entrance. The trail closely hugs the rock outcrops along the edge of Hell Canyon. In order to provide a wide and mostly level trail, the CCC constructed a substantial stone retaining wall along the downhill side of the path. The retaining structure was built into the side of the hill and then covered by earth and vegetation to disguise its manipulated appearance.

The construction of roads, parking lots, and pedestrian trails has reflected the indigenous topography throughout the history of development at the site. Minor changes addressing erosion and slope stabilization have occurred since the CCC constructed the stone steps in 1939. Short stone retaining walls were constructed on the up-slope portion of the lower surface trail to the cave opening by the National Park Service during the 1950s.

Vegetation

Overall District

The Ponderosa Pine forest has remained the dominant vegetative community within the proposed historic district throughout the recorded history of the site. The community has been managed with a primary approach of hands-off treatment since the establishment of the Monument in 1908. It is believed that the area has never

been logged, and known that it has definitely not been logged since the Monument was established in 1908. There are trees within the historic area that are at least 260 years old.³

An impact to vegetation at the site occurred in 2000 when the Jasper fire damaged native plants and appears to have encouraged the spread of invasive plants. Despite the fire, the vegetation in the area maintains a moderate to high level of integrity. Potential impacts include invasive exotic plants, and potentially damaging insects or diseases, also potential future forest fires pose a threat. Careful monitoring by the Forest Service on adjacent land and by the National Park Service within the Monument boundaries assists in lowering the potential impacts.

Historic Core

Within the historic core, alterations to vegetation have occurred to accommodate development and to address perceived aesthetic issues. The most intrusive of these changes was the removal of vegetation for the development of Service Road “A,” and the housing and other former buildings that were associated with this road. The area where a portion of the road has been removed contains herbaceous understory species, as well as road remnants including gravel.

The area immediately surrounding the Ranger Cabin includes some introduced plants—mainly *Juniperus* sp., planted around the front of the cabin. Historic photographs do not reveal evidence of this treatment during the historic period.

An area along the upper trail to the cave that contains very few pines is vegetated with herbaceous species including native grasses, sedges, and forbs. The

³ Chapter III provides information regarding the age of the trees in the historic area.

variety of species in this area hints that some species may have been planted to “beautify” the area. The plants appear to be native, indigenous plants that are neither intrusive nor invasive.

Views

Views to and from the cave entrance across Hell Canyon have changed very little since the period of significance. Although these views encompass a large land area, modern intrusions have not been introduced to distract from the historic view. There are no buildings, utility lines, billboards, signs, or graded areas that announce the current date. From the cave entrance the road cut for Highway 16 is apparent across Hell Canyon. Because the road was developed during the period of significance the road cut would have been a part of the view during that time.

Cultural Landscape Features

For the purpose of this analysis, buildings, structures, and small-scale elements within the Jewel Cave Historic Developed Area are referred to as *cultural landscape features*, or simply *features*. These have been grouped into three categories based on their relationship to the historic integrity of the district.

- Contributing Features are extant buildings, structures, or small-scale elements that were present and directly related to the historic character of the property during the period of significance; and continue to contribute to the overall integrity of the present-day historic landscape. Requirements for contributing elements are outlined within the discussion of associated property types in this chapter. These elements are eligible for listing in the National Register.

- Compatible Features are existing buildings, structures, or small-scale elements that were not present during the period of significance, but are compatible with the historic character of the property. These features do not detract from the integrity of the historic landscape. These elements are not eligible for listing in the National Register.
- Non-Contributing Features are existing buildings, structures, or small-scale elements that do not relate to the historic significance of the property and may impact the integrity of the historic landscape.

Tables 1, 2, and 3 provide lists of all of the contributing, compatible, and non-contributing features within the Jewel Cave Historic district, and a brief description of each. A summary of the integrity of contributing features is provided in Table 4.

TABLE 1: CONTRIBUTING FEATURES

<i>Contributing Feature</i>	<i>Description</i>	<i>Associated Property Type</i>
Ranger Cabin	CCC-constructed log cabin, built 1935	2 and 3
Upper Trail to cave entrance	4' concrete path was altered in 1960s, again in 1980s, some structural problems exist	2 and 3
Stone stairway	CCC-constructed 1939, some minor alterations	2 and 3
Metal railing at top of stairway	Simple pipe rail at edge of path	2
Lower trail to cave	Route established by CCC. The current 4'-wide concrete pavement was installed recently.	2 and 3
CCC-constructed retaining wall	Stone wall was constructed and covered with earth and vegetation by CCC. Some erosion is exposing the stones.	2 and 3
Cave entrance area	Pavement widens and terminates at iron gate to cave entrance. Interpretive site includes a bench and sign overlooking Hell Canyon.	2 and 3
Views to and from the cave entrance	Views are uninterrupted by modern intrusions and display the canyon, native rock outcrops, and Ponderosa pine trees.	3
Historic area entrance road	CCC-constructed road alignment into site.	2
Michaud archeological site	Archeological site with remnants of stone foundation.	1
Manhole at the seep/spring	CCC-constructed manhole has been repaired by the NPS.	2
Remnant of trail west of Ranger Cabin	Informal trail indicates portion of earlier route to the cave entrance.	2 and 3
Ponderosa pines in historic area	Many of these trees have been present for over 300 years. Most were scorched by the Jasper fire in 2000.	2 and 3
Highway 16	Portion near historic area entrance was established by 1901.	1
Building foundation remnants in Hell Canyon	Archeological site, concrete foundation.	1
Fireplace remnants in Hell Canyon	Archeological site, portions of masonry fireplace.	1
Hell Canyon Road	Historic route through the canyon. Cattle guard installed by CCC remains.	1
CCC-constructed cistern	Concrete cistern located on a rise near the Ranger Cabin.	3
Site of former NPS Campground	Area near Service Drive B that served as a NPS campground.	2

TABLE 2: NON-CONTRIBUTING, COMPATIBLE FEATURES

<i>Compatible Feature</i>	<i>Description</i>	<i>Associated Property Type</i>
NPS retaining wall	Stone retaining wall on the upslope side of the lower trail between the stone stairway and the seating area. Height varies from 2' to 3'-6". A 15' long portion of the wall is deteriorating.	2
Benches	Half-log benches echo the material and character of the historic Ranger Cabin.	2
Directional Signs	Small, simple signs indicating the locations of the Canyon's trail.	2
Historic Area Entrance Sign	Reconstructed ca. 1940s entrance sign	2 and 3
Trail to cabin	Gravel trail with wood curb-edge on the east side provides pedestrian route from parking area to the Ranger Cabin. The trail was damaged and repaired in 2003.	2
Visitor parking lot	Gravel lot for about 10 cars.	2
Stone steps on upper trail	Stone steps along the concrete trail are positioned in groups of one, two, and three.	2
Service Drive "B"	Associated with ca.1940's NPS development of area, and consistent with low-impact design philosophy.	2
Seating area on lower trail (Wayside #1)	Two benches at widened area in trail, under a rock ledge at a secondary cave opening. Site is interpreted.	2
Stainless steel gate at cave entrance	Gate modeled after original iron gate that is in the Monument's museum collection. The gate controls visitor access to the cave and includes horizontal openings to facilitate bat flight in and out of the cave.	2

TABLE 3: NON-CONTRIBUTING FEATURES

<i>Non-Contributing Feature</i>	<i>Description</i>	<i>Impacting District Integrity?</i>
Portable toilets	Bright colored fiberglass buildings.	Yes
Lantern storage shed	Log shed with shed roof and eye wash station.	Yes
Service Drive "A" And employee parking	Within historic core, added after 1950. Close to Ranger Cabin and upper trail to cave entrance. Impacts views in this area.	Yes
Pump Building	Concrete block shed building painted dark brown. Not visible from historic core.	No
Well cap	3' high structure with gable roof. Painted brown. The foundation appears to be settling.	No
Drinking fountain	Located along upper trail to cave near the circular seating area. Compatible use with type 2, but materials and style are not consistent with historic character.	Yes
Circular seating area near cabin	Gravel area with log benches. Possibly compatible with type 2.	Yes
Rocks at edge of employee parking area	Large rocks along edge of Service Drive "A."	Yes
Shrubs around the Ranger Cabin	Juniperus sp. at front and north side of Ranger Cabin.	No
Utility poles, lines, boxes	Overhead utility lines and poles. Possibly compatible with type 2.	No

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TABLE 4: Analysis of Integrity of Contributing Landscape Features

<i>Landscape Area/Feature</i>	<i>Level of Integrity</i>	<i>Location</i>	<i>Design</i>	<i>Setting</i>	<i>Materials</i>	<i>Work-manship</i>	<i>Feeling</i>	<i>Association</i>
<i>Ranger's Cabin</i>	<i>M/H</i>	<i>H</i>	<i>M/H</i>	<i>H</i>	<i>H</i>	<i>M/H</i>	<i>H</i>	<i>H</i>
<i>Upper trail to cave</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>L</i>	<i>M/L</i>	<i>M</i>	<i>H</i>
<i>Stone steps on trail</i>	<i>M</i>	<i>M</i>	<i>M/L</i>	<i>H</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>H</i>
<i>Stone stairway</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>
<i>Metal railing</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>
<i>Lower trail to cave</i>	<i>H/M</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>M</i>	<i>M/L</i>	<i>M</i>	<i>H</i>
<i>CCC retaining wall</i>	<i>M</i>	<i>H</i>	<i>H/M</i>	<i>H</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>H</i>
<i>Cave entrance area</i>	<i>H/M</i>	<i>H</i>	<i>H/M</i>	<i>H</i>	<i>H/M</i>	<i>M</i>	<i>H</i>	<i>H</i>
<i>Entrance Road</i>	<i>M/H</i>	<i>M/H</i>	<i>M/H</i>	<i>H</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>H</i>
<i>Michaud archy. site</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>H</i>
<i>Manhole at Spring</i>	<i>M/L</i>	<i>H</i>	<i>H</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>L</i>	<i>H</i>
<i>Pedestrian trail west of cabin</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>M</i>
<i>Ponderosa pines</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>H</i>	<i>N/A</i>	<i>H</i>	<i>H</i>

